# SOLEDAD MOUNTAIN PROJECT
# MOJAVE, KERN COUNTY
# CALIFORNIA

# ADMINISTRATIVE DRAFT
# ENVIRONMENTAL IMPACT REPORT
# ENVIRONMENTAL IMPACT STATEMENT

December, 1996

COUNTY OF KERN
PLANNING DEPARTMENT
BAKERSFIELD, CALIFORNIA

BUREAU of LAND MANAGEMENT
RIDGECREST RESOURCE AREA
RIDGECREST, CALIFORNIA

07330010.209

**WZI** INC.

December 20, 1996

Mr. Lee Delaney
Area Manager
U.S. Department of the Interior
Bureau of Land Management
Ridgecrest Resource Area
300 S. Richmond Road
Ridgecrest, California 93555

***Re: Golden Queen Mining Company Soledad Mountain Project Administrative Draft Environmental Impact Report/Environmental Impact Statement***

Dear Mr. Delaney:

Enclosed is one (1) copy of the referenced document prepared by WZI Inc. The document consists of one volume of text and five volumes of appendices. As requested by Ahmed Moshen, a copy of the text and the following appendices are included on a disk in the format of Word Perfect Windows 6.1:

- Appendix VI - Reclamation Plan and Revegetation Procedures for Soledad Mountain Project
- Appendix VIII- Groundwater Supply Evaluation for Soledad Mountain Project
- Appendix X - Estimated $PM_{10}$ and Air Toxics Emissions and Impacts Assessment

The grading plan (Appendix IV) and a preliminary noise analysis (Appendix XIII) will be submitted under separate cover by the end of the month.

Please contact me if you have any questions concerning this document.

Very truly yours,

Laura M. Bazeley
Manager of California Operations

LMB/er
Enclosure
cc: Richard Graeme, Golden Queen Mining Company
Larry Vredenburgh, BLM
07330010.244

## TABLE OF CONTENTS

# EXHIBITS

## EXHIBITS (CONTINUED)

## EXHIBITS (CONTINUED)

# TABLES

## APPENDICES

# EXECUTIVE SUMMARY

## INTRODUCTION

Golden Queen Mining Company, Inc. (Golden Queen), the project applicant, has proposed the development of the Soledad Mountain Project. The project consists of an open pit precious metals (gold and silver) mining and heap leach processing operation at Soledad Mountain, approximately five miles southwest of the unincorporated town of Mojave (population approximately 4,000) in Kern County, California.

The project area consists of approximately 1,600 acres, of which 1,165 acres are privately owned land and 435 acres are unpatented mining claims on public lands administered by the U.S. Bureau of Land Management, Ridgecrest Area Office of the California Desert District (BLM). The Kern County Planning Department is the lead agency for compliance with the California Environmental Quality Act (CEQA) and will oversee the implementation of and compliance with the Surface Mining and Reclamation Act of 1975 (SMARA), which is applicable to all mining operations within the State of California. BLM is the lead agency for compliance with the National Environmental Policy Act (NEPA) and will oversee compliance with the standards and procedures in the BLM regulations for surface mining of public land under the general mining law. This Administrative Draft Environmental Impact Report/Environmental Impact Statement (Administrative Draft EIR/EIS) has been prepared by Kern County in conjunction with BLM in accordance with the Memorandum of Understanding between Kern County and BLM.

The purpose of this Administrative Draft EIR/EIS is to analyze the environmental impacts of the Proposed Action and the four identified reasonable alternatives so that decision-makers will have adequate information on which to base their decision concerning the Soledad Mountain Project or the alternatives. This Administrative Draft EIR/EIS has been

prepared in six volumes. Volume I contains the text of the environmental analysis in Chapters 1 through 9. Volumes II through VI contain the appendices with technical reports in support of the environmental analysis.

## PROJECT LOCATION AND SETTING

The project is located within an unincorporated area of eastern Kern County. The project area is on and around Soledad Mountain, west of State Route 14 and south of Silver Queen Road. The project area includes portions of Sections 5, 6, 7, and 8 in Township 10 North, Range 12 West and Sections 1 and 12 in Township 10 North, Range 13 West, San Bernardino Base and Meridian. The entrance to the facilities will be from Silver Queen Road approximately 1.5 miles west of State Route 14.

The area surrounding the project is sparsely populated. Approximately 4 residences are located on Silver Queen Road to the north of Soledad Mountain. The Camelot housing and golf course development is located 3 miles north of the project area and consists of 109 houses on approximately 15 acres. Less than 10 additional homes are located on the north side of the golf course outside the development. Approximately 15 residences are located along Backus Road south of the mountain. Distances to the nearest urban centers include Bakersfield, approximately 49 miles northwest, Lancaster, approximately 22 miles south, and Los Angeles, approximately 62 miles southwest.

Industrial facilities in the area include chemical plants, recycling facilities, and airplane storage and repair facilities at the Mojave airport. In the higher elevations to the northwest of the site are several hundred windmills which generate electricity. Edwards Air Force base is located to the east and occupies a large portion of the desert floor.

Other open pit mining activity in the Mojave area near the project site includes Standard Hill (precious metals), Cactus Gold (precious metals), Granite Construction (aggregate and asphalt batch plant), Asphalt Construction (aggregate and asphalt batch plant), and California Portland Cement Mojave Plant (aggregate and cement plant).

The topography of the western Mojave Desert in the area of the site varies from relatively flat alluvial areas to steep mountains. Elevations vary from approximately 2,000 feet above mean sea level in the flat alluvial covered areas to over 5,000 feet in some of the mountainous areas. Soledad Mountain is a volcanic peak approximately 3 miles in diameter. The topography of the project area consists of rugged outcrops and ridges with intervening drainages which grade to alluvial slopes and flat areas on the flanks of Soledad Mountain. The elevation of the project area varies from 4,190 feet above mean sea level at the peak of Soledad Mountain to approximately 2,700 feet above mean sea level along the northeast flank.

Soledad Mountain has been the site of nearly continuous exploration for and mining of precious metals since gold was discovered there in 1894. As a result, the project site has approximately 215 acres of unreclaimed historical surface disturbance. In 1985, Golden Queen began its mineral rights acquisition and minerals exploration program. Golden Queen now owns or controls approximately 2,840 acres, including the 1,600 acre project area

## PROPOSED ACTION

### Construction and Operations

The Soledad Mountain Project is a proposal to develop an open pit precious metals (gold and silver) mining and heap leach processing operation with the potential for the production of aggregate and construction materials. Up to 60 million tons of ore and 230 million tons of overburden materials will be mined. The anticipated life of the project is

up to 15 years with employment expected for approximately 230 people. The project will operate 24-hours per day, 7-days per week. Processing operations will continue for approximately two years after the cessation of mining, at which time the project will begin closure and reclamation.

Construction is anticipated to begin in 1997 requiring nine to twelve months, employing about 250 people. Construction activities for the Soledad Mountain Project will include: construction of haulage and access roads to the open pit mine areas, preparation of the initial open pit mine production areas, leveling the crushing and sizing area and installing the equipment, grading the first cells of the heap leach pad and installing the liner and leak detection systems, creating growth media stockpiles, establishing water wells, erecting the process facility, grading the office and parking areas, and erecting office, maintenance and ancillary facilities.

Mining and processing is anticipated to begin in 1998. Up to 30 million tons of material is expected to be mined annually, of which up to 6 million tons will be ore. Mining will be done using conventional open pit, hard rock mining methods including: drilling of blastholes, blasting, loading haul trucks with shovels or front end loaders, hauling ore to the processing area, and hauling overburden to the overburden piles. These activities will be supported by bulldozers, road graders, water trucks, and miscellaneous service vehicles. Dust generation will be controlled by the use of dust suppressant palliatives and watering of roads and working areas.

Gold and silver will be recovered from the Soledad Mountain Project ore by cyanide heap leaching, followed by the Merrill-Crowe recovery process. These are proven, safe, conventional processes in wide general use throughout North America and the world.

Prior to leaching, the ore will be crushed and screened to reduce the ore to a nominal minus 10 mesh (about 1/16 inch) particle size. After crushing it will be agglomerated, a process where fine particles are used to coat larger particles to produce relatively

uniform size particles. These agglomerates enhance solution percolation within the heap leaching process. The agglomeration process will include the addition of cement and/or lime to the ore, which minimizes the evolution of cyanide from the leach solution. Throughout the crushing and agglomeration process, dust generation will be suppressed using water sprays and/or controlled by dust collectors.

The leaching process consists of a dilute, alkaline cyanide solution applied to the ore using drip irrigation type emitters. As the solution percolates through the ore, it dissolves the precious metals from the ore and carries them to the bottom of the heap. The pregnant solution will be collected on the impermeable heap leach pad liner inside the toe of the heap, pumped to the process plant, and, using the Merrill-Crowe process, processed for metal recovery. Following gold recovery, the solution, now barren of precious metals, is recycled as leach solution to the heap. After the precious metals have been recovered from the ore, it will be neutralized, graded, and reclaimed and revegetated in place.

The design concept for this project utilizes modified valley-fill heap leach pads in which dedicated heap leach pads with internal solution control are constructed. The heap leach pads will be designed as side hill leach pads with a perimeter dike supporting the toe of each heap and providing internal solution storage capacity. One of the most important attributes of this concept is the lack of solution ponds exterior to the leach pad. The toe dike creates a pond area for in-heap management of the solutions, runoff from precipitation and retention of the design storm event. The lack of barren and pregnant solution ponds minimizes hazards to wildlife and potential cyanide evolution.

The closest power lines that are capable of providing site power requirements are located at the northeast corner of the project site. A new substation will be constructed on the project site with overhead and underground distribution to serve the various locations on the project site.

The project will require the use of an average of 750 gallons per minute of water, pumped from three water supply wells, over the life of the project. This water will be used for dust control and to replenish the water lost in processing to evaporation and residual heap ore moisture. Bottled water will meet the potable water needs for the project.

It is expected that 80% of the project employees will live within commuting distance of the project. No additional roads will need to be constructed or improved. A portion of New Eagle Road, which now traverses a portion of the project site, will be vacated.

### RECLAMATION

Project operations will be followed by closure and reclamation of the site. The objectives of reclamation are: to assure that adverse environmental effects are prevented or minimized and that mined lands are reclaimed to a useable condition; to encourage the production and conservation of minerals while giving consideration to values relating to recreation, watershed, wildlife, range and forage, and aesthetic enjoyment; and to assure that residual hazards to the public health and safety are eliminated.

The reclamation component of the proposed project includes measures for:

- protection of wildlife and the public;
- preservation of access to future mineral resources;
- minimization of erosion and the potential for slope failure in the mine, overburden piles and heap leach piles;
- dismantling and removal of structures;
- neutralization of process components;
- salvage and storage of top soils for use as growth media;
- revegetation with seeds collected for the site and vicinity;
- slope reduction of the overburden piles;

- contouring and surface preparation of the top horizontal surfaces of the overburden piles;
- contouring and surface preparation of the top and sides of the heap leach piles;
- contouring and surface preparation of exploration disturbances and production support facilities sites; and
- revegetation of the prepared surfaces of the overburden piles, heap leach pads, and support facility sites.

A total of 930 acres will be disturbed by the project, approximately 215 of which have been disturbed as a result of prior activities on the site. Except for the open pit mine, which covers 265 acres, and 20 acres of process area highwall and side slope, all disturbed acreage will be subject to reclamation and/or stabilization processes. A total of 375 acres will be revegetated using locally gathered seeds.

To assure that reclamation and heap neutralization will be satisfactorily completed at no public expense, financial assurances will be posted by Golden Queen prior to construction with Kern County, BLM, and the Lahontan Regional Water Quality Control Board.

At least 25 separate federal, state, county, and local permits and/or approvals will be necessary before construction and operation of the project can begin.

## ENVIRONMENTAL IMPACT OF THE PROPOSED ACTION

Environmental impacts of the proposed action upon each of the following resources have been analyzed and conclusions of significance reached. These impacts are summarized below.

- Mineral Resources

  Utilization of the known mineral resources will increase the potential for the discovery of additional mineral resources, currently unknown, and is consistent will land use policies encouraging the development of mineral resources. The environmental impact on mineral resources will be beneficial.

- Physiography and Geology

  The topography of the project site will be altered by the creation of an open pit mine, overburden piles, and heap leach pads. These will be permanent land forms after reclamation is complete. The environmental impact on topography will be significant and unavoidable.

  Geologic understanding of the area will be enhanced by improved access for observation and interpretation. New facilities will be constructed in accordance with the Uniform Building Code for the seismic risk at the site. Many existing seismic hazards will be eliminated by project development providing a beneficial impact. The overall environmental impact on geology and seismicity will be less than significant.

- Soils

  Four soil types will be disturbed, two of which will be collected for reclamation use as growth media. An approved site grading plan will provide for storm water and erosion control. Since the area soils are rocky and nutrient poor and the best soils will be salvaged for reuse, the environmental impact upon soils will be less than significant.

- Hydrology

  Overburden piles are not acid producing and will not release substances to the environment which might potentially degrade surface or groundwater. Ore heaps will be constructed and managed according to Lahontan Regional Water Quality Control Board requirements and regulations. An approved site grading plan will control storm water runoff. The project will be a zero discharge facility. Reagents, chemicals, fuels, lubricants and supplies will be stored, used, and disposed of in accordance with all regulatory agency requirements. Leak detection systems will be installed and monitored. The environmental impact upon surface water and water quality will be less than significant.

  Approximately 750 gallons of water per minute will be used over the life of the project, which is less than 7% of the estimated recharge to the basin. This will result in a localized water table drawdown but will not significantly affect other water supply wells. The groundwater will recover to within 80% of its preproject level within 5 years after discontinuing the use of the project water supply wells. The environmental impact upon water supply will be less than significant.

- Air Quality and Meteorology

  There will be no impacts upon area weather patterns resulting from the project. Operations will be conducted using best available control technology under permits issued by the Kern County Air Pollution Control District. United State Environmental Protection Agency approved air quality modeling methods indicate that the environmental impact upon air quality will meet district air quality standards and will be less than significant. Existing ambient air quality will be improved in the long term through reclamation of existing tailings piles that contribute a calculated 136,000 pounds of $PM_{10}$ emissions per year. The long term impact on air quality will be beneficial.

- Biology

  No endangered, threatened, rare, or sensitive plant or animal species have been found at the site. Site disturbance will affect existing plants and animals until reclamation is complete. Fencing, heap leach pad, and agglomeration designs will limit wildlife contact with process solutions. Reclamation of the site, using locally gathered seeds, will reduce the environmental impact to biological resources to less than significant.

- Cultural and Historical Resources

  Four historical sites have been identified as having scientific and historical value. Salvage excavation, architectural recording, and data recovery will be performed at each of these sites prior to construction. A viewing and informational kiosk, which will include site historical information, will be built. Without these studies deterioration of these sites will continue and their value will be lost.

  By definition, disturbance of these sites would constitute a significant (and possibly unavoidable) environmental impact. As a result of the data recordation efforts proposed, this impact will be mitigated to less than significant. These efforts, combined with the likely loss of these resources if no action occurs, combine to produce an overall beneficial environmental impact as a result of the proposed action.

- Paleontological Resources

  The geology of the site makes it unlikely that paleontological resources will be found. Therefore the environmental impact upon paleontological resources will be less than significant.

- Visual Resources

  Impacts will result from the surface disturbance associated with construction and mine operations. Reclamation of the site will reduce the long term impact. The view from residences immediately north of Soledad Mountain and, to a lesser extent, along Backus Road to the south of Soledad Mountain, will be affected. The Proposed Action, while retaining the basic elements of the form, line, color, and texture of the mountain, may attract attention. Evaluation of the impact using BLM Visual Resource Management methods indicates a weak contrast in relation to other current and historical activities in the surrounding region. This, combined with the viewing distance from towns and major travel routes, indicates that the environmental impact upon visual resources will be less than significant.

- Noise

  The project site is zoned for mineral development and mining. Current sources of noise include sonic booms, vehicle traffic from nearby major roads, and trains on nearby railroad tracks. The local terrain is complex, sheltering noise which may be generated from mining operations. There will be a perceptible increase in area noise, attenuated by distance, during the life of the project. The maximum noise levels generated from the project will be within the limits recommended by the Noise Element of the Kern County General Plan. The environmental impact of noise will be less than significant.

- Land Use

  The majority of the project site is zoned for Limited Agriculture. The Specific Plan for Soledad Mountain - Elephant Butte and Vicinity - South of Mojave use designation for the site is for mineral extraction and processing, public lands, and low density residential uses. Public lands managed by BLM at the site include mining as a permitted use. The primary land use within the project area consists of mineral exploration, minerals development, and open space.

Mineral rights for the site have been acquired by Golden Queen and no legal restraints to the project exist. A portion of New Eagle Road extending into the project site will be vacated. Following reclamation, the site will be returned to preproject land uses. The environmental impact upon land use is less than significant.

- Recreation

  Little or no recreational use of the project site currently exists. Most private lands are fenced and access is restricted. There are no identified BLM routes for off highway vehicles. The environmental effect of the project upon recreation will be less than significant.

- Socioeconomics

  The project will create 250 construction jobs, approximately 230 full-time jobs, and 136 indirect jobs. During the construction period, approximately $13.7 million would flow to the local economy. The value added to the region over the life of the project is estimated at $11 million per year. Tax receipts would exceed government services provided. Most employees would come from the local area, and no growth inducing impacts would result. The project will substantially enhance the local economy and its environmental impact on socioeconomics will be beneficial.

- Health Hazards and Public Safety

  A health risk assessment for the project has indicated that no significant risk from project related toxic contaminants or activities will occur. District air quality standards and regulations will be met. Project construction and reclamation activities will eliminate or reduce existing hazards from historical mining activities such as particulate emissions from blowing tailings, access to existing underground mine openings, and unstable structures. The environmental impact upon health hazards and public safety will be beneficial.

- Traffic and Transportation

  The project will increase traffic by 375 average daily trips, an increase of 91% over the current level. Silver Queen Road is a County road constructed and maintained to support truck traffic as well as passenger vehicles. The capacity of Silver Queen Road is 15,000 average daily trips. The volume to capacity ratio of Silver Queen Road will be increased from its current 0.03 level to 0.05. Potential aggregate sales could result in an additional 140 average daily trips, increasing the volume to capacity ratio to 0.06. Ample parking will be provided on the project site. Local transit requirements will not be affected since most of the employees will be local residents. There is little pedestrian traffic in this undeveloped area, so there will be no effect upon pedestrians. The environmental impact upon traffic and transportation will be less than significant.

Table S.1 summarizes the environmental impacts, regulatory requirements, and project design features of the proposed action.

The overall and long term environmental impacts of the proposed action, including the implementation of the reclamation plan, are significant and unavoidable only to the topography of the project area. The proposed action provides for beneficial impacts upon mineral resources, seismic hazards, cultural and historical resources, and socioeconomics. The remainder of the resource impacts have been found to be less than significant.

## ALTERNATIVES

A total of sixteen alternatives to the proposed action were considered for evaluation as potentially offering options that might reduce or eliminate any environmental impacts associated with the proposed action. These included alternative mining techniques, overburden disposal methods, precious metals recovery processes, project site and

facility locations, and power supplies. Of these, four were selected as reasonable alternatives for environmental impact analysis. Those alternatives selected for consideration are:

- No Action - in which the proposed project is not approved and no change from existing environmental conditions occurs.
- Increased mining and processing rates - in which the rate of mining and processing is increased by 20%.
- Decreased mining and processing rates - in which the rate of mining and processing is reduced by 20%.
- Reduced project size - in which the total amount of mining is reduced to avoid topographic impact to significant ridge lines of Soledad Mountain.

## CONCLUSIONS

Evaluation of these alternatives resulted in the following conclusions:

- None of the alternatives are environmentally superior to the proposed action.
- The proposed action is the Preferred Alternative and the Environmentally Superior alternative.
- The no action alternative has negative impacts relative to the proposed action in the areas of mineral resources, seismic hazards, long term air quality, cultural and historical resources, socioeconomics, and health hazards and public safety. It is positive only in its impact on topography and visual resources.

- The increased rate alternative should be eliminated from consideration due to the estimated $PM_{10}$ emissions exceedence of the state 24-hour $PM_{10}$ air quality standard. The emissions were modeled assuming best available control technology.
- The decreased rate alternative is not environmentally superior to the proposed action.
- The reduced size alternative has a positive impact with respect to the proposed action on topography but is equivalent in all other respects. Its economic feasibility is marginal, potentially making it the effective equivalent of the no action alternative.

## ISSUES

As provided by NEPA and CEQA, interested and affected parties, both public and private, were afforded the opportunity to review the Notice of Intent to prepare an EIR/EIS and the Notice of Preparation of the EIR/EIS and to comment concerning issues to be addressed in the document. Comments were received during two public scoping meetings as well as from written comments. The issues raised include the project's impact upon:

- Storm water runoff and erosion control
- Water supply and availability
- Water quality
- Damage to public roads by heavy truck traffic
- Vibration damage (from blasting) to structures and water wells
- Visual impacts
- Health impacts from dust, fumes, and toxic emissions
- Noise
- Traffic
- Property values

Each of these issues was given special attention and consideration in the development of the impact analyses and the conclusions derived from the analyses.

## SIGNIFICANT IMPACTS AND MITIGATION MEASURES

Two significant impacts are identified within the Preferred Alternative, which is the proposed action. They include the impact of the project upon the topography of the site and upon cultural and historical resources.

The nature of the project will necessarily affect the topography of the site and will result in the creation of mine highwalls, heap leach piles, and overburden piles. Even after reclamation is complete, these features will remain. Other than those reclamation actions proposed in the reclamation plan, no mitigation measures have been proposed or specified that have the ability to reduce the impact of the project to less than significant.

Resources of cultural and historical significance will be impacted by the project. This impact will be mitigated to a less than significant impact through site investigations and recordation of data. Since these sites are deteriorating and their historical significance would likely be lost without this effort, the overall impact of the project upon these resources is judged to be beneficial.

Although each of the other resources analyzed for environmental impact will be affected in some manner, each of the other impacts were found to be either less than significant or beneficial. Therefore no additional mitigation measures are recommended.

## Summary of Environmental Impacts, Regulatory Requirements, and Project Design Features

Following is Table S.1, which presents a summary of the environmental impacts associated with the Preferred Alternative, the regulatory requirements which the project must meet, and the design features of the project which will minimize the impact of the project upon the environment.

**TABLE S.1**
**EXECUTIVE SUMMARY OF ENVIRONMENTAL IMPACTS**

| ENVIRONMENTAL ISSUE AND IMPACT | REGULATORY REQUIREMENT DESIGN FEATURES | PROJECT DESIGN FEATURES | LEVEL OF SIGNIFICANCE | MITIGATION MEASURES | RESIDUAL IMPACTS |
|---|---|---|---|---|---|
| **Mineral Resources**<br>1. Loss of access to mineral resources. | | Exploration activity to identify areas of mineral resources which will not be covered by overburden or heap piles. | Beneficial | | |
| **Physiography and Geology**<br>1. Natural ground contours would be modified during construction and operation. | | Heap leach pile slopes will be regraded during reclamation to an overall angle of 2.5:1.0 (horizontal to vertical) on the down slopes and to 2.0:1.0 on the side slopes.<br><br>During final site operations and/or reclamation, overburden will be graded to break up the unnatural angles at the top edges. The overburden slopes will not exceed 1.8:1.0 (horizontal to vertical) after reclamation. | Significant and Unavoidable | | Change in topography |
| 2. Potential ground motion from earthquakes could cause instability of slopes or pose a hazard to site facilities. | A Slope Stability Analysis has determined the safe slopes for the heap leach and the overburden piles.<br><br>Construction of buildings and structures would be in accordance with the Uniform Building Code and applicable County ordinances. | Heap leach pile slopes will be constructed at an overall angle of about 2:1 (horizontal to vertical) or less with benches for stability. During reclamation, slopes will be graded smooth.<br><br>Mine pit slopes will be evaluated throughout operations to assure that excavation occurs at a slope angle that is safe, considering actual rock strength and structural conditions encountered. Benches will be provided to catch loose rocks. | Less Than Significant | | |

**TABLE S.1 (CONTINUED)**
**EXECUTIVE SUMMARY OF ENVIRONMENTAL IMPACTS**

| ENVIRONMENTAL ISSUE AND IMPACT | REGULATORY REQUIREMENT DESIGN FEATURES | PROJECT DESIGN FEATURES | LEVEL OF SIGNIFICANCE | MITIGATION MEASURES | RESIDUAL IMPACTS |
|---|---|---|---|---|---|
| **Physiography and Geology (Continued)**<br>3. Potential ground motion from earthquakes could cause collapse of former underground mine areas and aboveground historical structures on the project site. | An Emergency Response Plan will be established. | Old underground mine areas will be excavated or remediated to remove the risk of collapse during a seismic event. Historical structures will be removed or stabilized. | Beneficial | | |
| **Soils**<br>1. Potential loss of topsoil due to surface disturbances or ercsion. | A site grading and drainage plan has been designed to direct and contain storm water and site runoff.<br><br>Water bars, riprap and other stabilization measures will be incorporated into the site drainage system, where required, to control erosion. Site drainages will be inspected periodically to assure that excessive erosion is not occurring. If excessive erosion is detected after a rainstorm, it will be controlled and reported to BLM and the County. | Material suitable for use as growth media will be salvaged from areas to be disturbed, in accordance with the approved reclamation plan. Stockpiled growth media will be used to resoil disturbed areas.<br><br>Growth media stockpiles will be stabilized by allowing germination of seeds naturally contained in the soil.<br><br>Soils in areas subject to minimal disturbance, such as soil stockpiles and water well sites, will be left in place and stabilized, as necessary, in accordance with the reclamation plan.<br><br>Minimize unnecessary surface disturbance during construction and operations by using best management practice | Less Than Significant | | |

**TABLE S.1 (CONTINUED)**
**EXECUTIVE SUMMARY OF ENVIRONMENTAL IMPACTS**

| ENVIRONMENTAL ISSUE AND IMPACT | REGULATORY REQUIREMENT DESIGN FEATURES | PROJECT DESIGN FEATURES | LEVEL OF SIGNIFICANCE | MITIGATION MEASURES | RESIDUAL IMPACTS |
|---|---|---|---|---|---|
| **Hydrology**<br>1. Drawdown of groundwater levels due to pumping for project activities. | New water wells will be drilled under a permit from Kern County Environmental Health Services Department. | Water withdrawal from the aquifer will be monitored and recorded to assure that groundwater drawdown does not exceed estimated drawdowns. | Less Than Significant | | |
| 2. Changes to surface water flow and downgradient hydrologic balance due to project-related drainage controls. | Grading Permit to prevent storm water runoff damage and erosion. The Site Grading Plan will address the results of a 20-year, 1-hour storm event.<br><br>A General Construction Activity Storm Water Permit will be filed with the Lahontan Regional Board. | Measures will be taken to reduce erosion potential during project construction, operation and reclamation. In addition to practices described in the Site Grading Plan including measures required by the County and BLM, the following will occur:<br><br>- Site drainage will be retained onsite.<br><br>- Site roads and drainage facilities would be inspected after rainfall events resulting in surface flow. Maintenance would occur promptly, as needed.<br><br>- Drainage from the tops of overburden piles will be directed away from the slopes toward the open pit.<br><br>- Salvaged growth media will be stockpiled away from areas of concentrated drainage.<br><br>- Reclamation of disturbed surfaces will occur as soon as practical. | Less Than Significant | | |

**TABLE S.1 (CONTINUED)**
**EXECUTIVE SUMMARY OF ENVIRONMENTAL IMPACTS**

| ENVIRONMENTAL ISSUE AND IMPACT | REGULATORY REQUIREMENT DESIGN FEATURES | PROJECT DESIGN FEATURES | LEVEL OF SIGNIFICANCE | MITIGATION MEASURES | RESIDUAL IMPACTS |
|---|---|---|---|---|---|
| **Hydrology (Cont'd)**<br>3. Potential impacts to surface/groundwater quality. | A Report of Waste Discharge will be filed with the Lahontan Regional Board which will issue Waste Discharge Requirements for Golden Queen to follow in accordance with 23 CCR chapter 15, Article 7.<br><br>Procedures to contain processing liquids would be based on Lahontan Regional Board regulations and would include the following:<br><br>- Testing of soil and foundation materials under liner.<br><br>- Low Permeability liner systems for the heap leach pad and other areas of solution containment.<br><br>- Materials for pad liner cover will effectively control hydrostatic head over the liner and the material placed in direct contact with the liner will not exceed 1.5 inches in diameter.<br><br>- Monitoring systems such as leachate detection, vadose zone monitoring, and groundwater monitoring, to assure process circuit containment is functioning as designed. | Exposed portions of processing solution and reagent storage containment facilities will be routinely inspected for deterioration.<br><br>A cyanide destructing compound (e.g., hydrogen peroxide or calcium hypochlorite) will be maintained onsite for use in the event that an environmentally threatening spill occurs. For minor spills that do not pose an immediate threat, affected soil could be excavated and placed on the leach pad in lieu of chemical treatment.<br><br>Historical mining wastes and tailings piles will be tested and disposed of properly.<br><br>Golden Queen will consult with the Lahontan Regional Board prior to applying dust suppression or soil stabilization chemicals, and shall provide the Lahontan Regional Board and County with Material Safety Data Sheets or other information on the chemical make-up of products used on roads and other disturbed surfaces. | Less Than Significant | | |

**TABLE S.1 (CONTINUED)**
**EXECUTIVE SUMMARY OF ENVIRONMENTAL IMPACTS**

| ENVIRONMENTAL ISSUE AND IMPACT | REGULATORY REQUIREMENT DESIGN FEATURES | PROJECT DESIGN FEATURES | LEVEL OF SIGNIFICANCE | MITIGATION MEASURES | RESIDUAL IMPACTS |
|---|---|---|---|---|---|
| **Hydrology (Cont'd)**<br>3. Potential impacts to surface/groundwater quality. | - Adequate freeboard at the leach pad to safely contain storm runoff from within the heap leach system and draindown of solution from the leach pad in the event pumps could not operate because of a power failure.<br><br>- Neutralization of the heap leach pile at the time of abandonment.<br><br>Water quality will be monitored for one year prior to the use of cyanide as background information.<br><br>Monitoring reports will be routinely submitted to the Lahontan Regional Board specifying monitoring results according to the Monitoring and Reporting Program.<br><br>A Closure and Post-Closure Maintenance Plan will be approved by the Lahontan Regional Board.<br><br>Financial assurance will be posted by Golden Queen to assure neutralization and closure of the heap leach pad is completed.<br><br>Hazardous waste will be handled and stored in accordance with applicable regulations and transported offsite to an appropriately permitted treatment and disposal facility.<br><br>Secondary containment will be provided for the entire contents of the tank, plus adequate freeboard. | | Less Than Significant | | |

**TABLE S.1 (CONTINUED)**
**EXECUTIVE SUMMARY OF ENVIRONMENTAL IMPACTS**

| ENVIRONMENTAL ISSUE AND IMPACT | REGULATORY REQUIREMENT DESIGN FEATURES | PROJECT DESIGN FEATURES | LEVEL OF SIGNIFICANCE | MITIGATION MEASURES | RESIDUAL IMPACTS |
|---|---|---|---|---|---|
| **Hydrology (Cont'd)**<br>3. Potential impacts to surface/groundwater quality. | Periodic visual inspections for leakage or deterioration of tanks, fittings or containment facilities.<br><br>Truck-transfer areas will be graded to contain potential spills.<br><br>Development of a detailed spill Prevention, Countermeasure and Control Plan.<br><br>An approval for the septic system design will be obtained from Kern County Environmental Health Services Department. | | | | |
| **Meteorology**<br>1. Project activities could result in a change in the weather patterns. | | No impacts are expected. | No impacts. | | |
| **Air Quality**<br>1. Emissions from project activities. | The Kern County APCD will review facility designs and operations for compliance with regulations for the protection of air quality. An application for Authority to Construct will be submitted to the Kern County APCD. | Onsite vehicles and equipment will be maintained on a routine basis, as recommended by manufacturer manuals, to reduce exhaust emissions.<br><br>Monitoring stations for $PM_{10}$ will be established upwind and downwind from the processing facilities.<br><br>Installation of a mercury retort to control mercury emissions. | Less Than Significant | | |

**TABLE S.1 (CONTINUED)**
**EXECUTIVE SUMMARY OF ENVIRONMENTAL IMPACTS**

| ENVIRONMENTAL ISSUE AND IMPACT | REGULATORY REQUIREMENT DESIGN FEATURES | PROJECT DESIGN FEATURES | LEVEL OF SIGNIFICANCE | MITIGATION MEASURES | RESIDUAL IMPACTS |
|---|---|---|---|---|---|
| **Air Quality (Continued)**<br>1. Emissions from project activities. | Permitted sources of emissions are required to have Best Available Control Technology (BACT).<br><br>Low sulfur diesel fuel will be used in all heavy equipment internal combustion engines.<br><br>Roads will be maintained on a routine basis. Appropriate dust suppression techniques will be used on roads and disturbed surfaces to minimize fugitive emissions.<br><br>Monitoring of cyanide concentrations at leach pad and process. | The size and number of blasts in the mine will be limited by good engineering design.<br><br>The existing tailings piles will be removed, thereby reducing the long term fugitive emissions. | Beneficial | | |
| 2. Potential emissions of hydrogen cyanide (HCN) gas from leaching operations. | | HCN emissions will be minimized by controlling the pH of cyanide solutions.<br><br>Pregnant cyanide solution will be contained within the heap leach piles, thereby eliminating the need for open ponds.<br><br>Cyanide will be applied by a drip system.<br><br>The agglomerated ore design prevents ponding of cyanide solution around the drip emitters.<br><br>All cyanide solutions are contained. | Less Than Significant | | |

## TABLE S.1 (CONTINUED)
## EXECUTIVE SUMMARY OF ENVIRONMENTAL IMPACTS

| ENVIRONMENTAL ISSUE AND IMPACT | REGULATORY REQUIREMENT DESIGN FEATURES | PROJECT DESIGN FEATURES | LEVEL OF SIGNIFICANCE | MITIGATION MEASURES | RESIDUAL IMPACTS |
|---|---|---|---|---|---|
| **Vegetation**<br>1. Project activities would result in new vegetation disturbance, primarily of creosote bush scrub plant. | A Reclamation Plan is filed with Kern County in accordance with SMARA regulations.<br><br>Financial assurance will be posted by Golden Queen to assure appropriate revegetation efforts are completed, as required by 43 CFR, 3809 and SMARA.<br><br>The areas to be revegetated include the heap leach pad, plant facilities, unnecessary roads, top horizontal portions of overburden piles, a portion of the pit haul road, and flat surface areas. | Disturbance will be minimized to that necessary for safe and efficient operation. Limits of construction areas should be clearly marked (e.g., flagged prior to earthwork activities), and vehicles and equipment would be confined to these areas.<br><br>Suitable growth media will be salvaged and stockpiled for use in reclamation in accordance with the approved reclamation plan.<br><br>The seed mix will emphasize shrub species native to the site area, designed to reestablish a plant community similar to that which existed prior to disturbance.<br><br>Fencing around the heap leach pile will remain in place, until vegetation is reestablished, or as otherwise specified in the approved reclamation plan. | Less Than Significant | | |
| 2. Surface disturbance could provide opportunities for establishment of noxious weeds. | | Monitoring for the potential establishment of noxious weeds would occur as a part of the revegetation success monitoring. A program to control noxious weeds would be implemented. | Less Than Significant | | |
| 3. Project activities would result in the reclamation of previously disturbed areas. | | Historical mining disturbance will be reclaimed to the extent feasible. | Beneficial | | |

**TABLE S.1 (CONTINUED)**
**EXECUTIVE SUMMARY OF ENVIRONMENTAL IMPACTS**

| ENVIRONMENTAL ISSUE AND IMPACT | REGULATORY REQUIREMENT DESIGN FEATURES | PROJECT DESIGN FEATURES | LEVEL OF SIGNIFICANCE | MITIGATION MEASURES | RESIDUAL IMPACTS |
|---|---|---|---|---|---|
| **Wildlife**<br>1. Reduction of wildlife habitat due to project surface disturbance. | A preconstruction survey of the wildlife will be conducted during the most favorable conditions prior to start of construction. Any threatened or endangered species discovered will be subject to appropriate action in consultation with the USFWS and the CDFG.<br><br>A consultation with the U.S. Fish and Wildlife Service will take place.<br><br>A consultation with the California Department of Fish and Game will also take place. | Grading will be minimized to the extent consistent with safe and efficient operations to limit the total area of surface disturbance.<br><br>Site reclamation will include efforts to reestablish habitat similar to that naturally occurring at the site, including utilization of a seed mix emphasizing native shrubs.<br><br>Revegetation efforts will be initiated in areas that would not be subject to additional disturbance.<br><br>Routine distribution of cyanide solution on the top of the heap leach pad will occur via a drip irrigation system and the heap leach pad will be contoured to prevent surface ponding which could attract birds and small animals.<br><br>The agglomerated ore design prevents ponding of cyanide solution around the drip emitters.<br><br>Cyanide solution will be transported to the process plant in closed piping to prevent open solution from attracting wildlife.<br><br>Containers of reagents will be stored within controlled reagent storage areas and kept closed, stored in enclosed areas, or otherwise managed to prevent access by wildlife. | Less Than Significant | | |

**TABLE S.1 (CONTINUED)**
**EXECUTIVE SUMMARY OF ENVIRONMENTAL IMPACTS**

| ENVIRONMENTAL ISSUE AND IMPACT | REGULATORY REQUIREMENT DESIGN FEATURES | PROJECT DESIGN FEATURES | LEVEL OF SIGNIFICANCE | MITIGATION MEASURES | RESIDUAL IMPACTS |
|---|---|---|---|---|---|
| **Wildlife (Continued)**<br>2. Noise and human presence from project operations could impact surrounding wildlife. | Mobile and stationary vehicles, equipment and machinery would be equipped with mufflers, as required by the Mining Safety and Health Administration (MSHA). | Project waste would be properly managed at the site to contro garbage that could attract wildlife.<br><br>Vehicles will be limited to 25 MPH.<br><br>Wildlife habitat awareness will be included in the worker education program. | Less Than Significant | | |
| **Cultural Resources**<br>1. Project-related activities could disturb or destroy potentially significant sites. | Construction contractors and operations personnel will be instructed regarding the sensitivity of cultural resources and the presence of laws against unauthorized collection or disturbance. Golden Queen will provide this instruction as part of its worker education program. Appropriate personnel will be instructed that surface disturbance must cease immediately in any area in the event a cultural resource is discovered.<br><br>Sites CA-KER-4450H, CA-KER-4695H, and CA-KER-4693H will have an archaeological monitor review as they are graded, and any potentially valuable artifacts will be salvaged. | A small display area will be established to provide information to the public concerning historical mining activities on-site. | Significant | A Phase III Data Recovery (salvage excavation and architectural recording) will be conducted at sites CA-KER-4446H, CA-KER-4447H, CA-KER-4448, and CA-KER-4449H. | Less Than Significant |
| **Paleontology Resources**<br>1. Project activities could result in disturbance of paleontological resources. | | No fossils are expected to occur on Soledad Mountain. | Less Than Significant | | |

**TABLE S.1 (CONTINUED)**
**EXECUTIVE SUMMARY OF ENVIRONMENTAL IMPACTS**

| ENVIRONMENTAL ISSUE AND IMPACT | REGULATORY REQUIREMENT DESIGN FEATURES | PROJECT DESIGN FEATURES | LEVEL OF SIGNIFICANCE | MITIGATION MEASURES | RESIDUAL IMPACTS |
|---|---|---|---|---|---|
| **Visual Resources**<br>1. Operational activities, equipment and structures would change the visual character of the site. | All buildings, equipment, supplies, piping and debris will be removed from the site upon completion in conformance with the reclamation plan. Foundations will be broken and removed from the site or buried in accordance with procedures acceptable to BLM and the County. Underground utilities will be capped below grade.<br><br>Disturbed areas will be regraded and revegetated in conformance with the reclamation plan. | Surface disturbance will be minimized to that required for safe and efficient operation.<br><br>Buildings and structures will be painted with nonreflective earthtone colors to blend with the predominant background.<br><br>Dust control measures will be employed to reduce the potential visual impact of fugitive dust.<br><br>Outdoor lighting for the mine pit and other areas of nighttime activities will be shielded and directed downward to reduce fugitive light. Light poles will be no higher than necessary for safe and efficient lighting. Low-pressure sodium bulbs or other appropriate technology will be used for outdoor lighting, where practical, to reduce the potential for night sky impact.<br><br>Historical mining disturbance will be reclaimed.<br><br>Top surfaces or overburden piles will be graded during reclamation to facilitate revegetation. Overall face slopes would be about 1.8:1.0 (horizontal to vertical). | Less Than Significant | | |

**TABLE S.1 (CONTINUED)**
**EXECUTIVE SUMMARY OF ENVIRONMENTAL IMPACTS**

| ENVIRONMENTAL ISSUE AND IMPACT | REGULATORY REQUIREMENT DESIGN FEATURES | PROJECT DESIGN FEATURES | LEVEL OF SIGNIFICANCE | MITIGATION MEASURES | RESIDUAL IMPACTS |
|---|---|---|---|---|---|
| **Noise**<br>1. Noise levels would increase in the vicinity of the project due to construction and operations. | Machinery, equipment and vehicles would be equipped with mufflers in accordance with MSHA requirements. | Construction activities will take place largely during daylight in order to minimize impacts from construction noise on nearby residents.<br><br>Blasting would be engineered to minimize the amount of explosives used, consistent with obtaining desired results. | Less Than Significant | | |
| **Land Use**<br>1. Land is currently zoned for mining. | | | Less Than Significant | | |
| 2. The Specific Plan for Soledad Mountain Elephant Buttes - and vicinity allows for mining in the area. | | | Less Than Significant | | |
| 3. Mineral Rights would be affected. | | Golden Queen has acquired or is in final negotiation for all necessary interests. | Less Than Significant | | |
| 4. Legal restraints: All necessary permits will be obtained before the start of the project. | | Golden Queen has acquired the legal right to mine in the project area. | Less Than Significant | Vacate New Eagle Road within the project area. | None |

**TABLE S.1 (CONTINUED)**
**EXECUTIVE SUMMARY OF ENVIRONMENTAL IMPACTS**

| ENVIRONMENTAL ISSUE AND IMPACT | REGULATORY REQUIREMENT DESIGN FEATURES | PROJECT DESIGN FEATURES | LEVEL OF SIGNIFICANCE | MITIGATION MEASURES | RESIDUAL IMPACTS |
|---|---|---|---|---|---|
| **Recreation**<br>1. Recreation in the area could be distributed. | | The private lands are restricted. There is no designated recreation on federal lands. | Less Than Significant | | |
| **Socioeconomics**<br>1. Opportunity for jobs and economic welfare due to personal income, taxes, revenues and expenditures. | | | Beneficial | | |
| 2. Potential impact on values of residential properties in the vicinity. | | | Less Than Significant | | |

**TABLE S.1 (CONTINUED)**
**EXECUTIVE SUMMARY OF ENVIRONMENTAL IMPACTS**

| ENVIRONMENTAL ISSUE AND IMPACT | REGULATORY REQUIREMENT DESIGN FEATURES | PROJECT DESIGN FEATURES | LEVEL OF SIGNIFICANCE | MITIGATION MEASURES | RESIDUAL IMPACTS |
|---|---|---|---|---|---|
| **Health and Safety**<br>1. Potential for hazard exposure to site employees and visitors to the site. | Site operations will be conducted in compliance with MSHA regulations.<br><br>The routes of hazardous materials being shipped to and away from the proposed project will be coordinated with the California Highway Patrol or other appropriate agencies.<br><br>Transportation of materials and equipment to the site would be regulated under state, federal, and local laws, regulations, and ordinances.<br><br>Storage, use, and disposal of all hazardous materials will be in accordance with all federal, state, and local regulations, codes, and rules.<br><br>Storage and use of explosives would occur in compliance with federal regulations.<br><br>Toxic Emissions Inventory Report will be submitted to KCAPCD.<br><br>Hazardous Material Business Plan and Inventory will be submitted to the Kern County Fire Department.<br><br>Onsite personnel will receive annual training in emergency response procedures.<br><br>Used oil and solvents will be collected and sent offsite to a licensed recycler. | Fences would be erected around potentially hazardous areas to discourage entry by unauthorized mine personnel or visitors. | Less Than Significant | | |

**TABLE S.1 (CONTINUED)**
**EXECUTIVE SUMMARY OF ENVIRONMENTAL IMPACTS**

| ENVIRONMENTAL ISSUE AND IMPACT | REGULATORY REQUIREMENT DESIGN FEATURES | PROJECT DESIGN FEATURES | LEVEL OF SIGNIFICANCE | MITIGATION MEASURES | RESIDUAL IMPACTS |
|---|---|---|---|---|---|
| **Health and Safety (Continued)**<br>2. Potential for hazard exposure from historical mining activity. | | Historical mining openings will be removed or closed to the extent feasible. Former mine waste will be removed. | Beneficial | | |
| **Transportation**<br>1. Increase of traffic on roadways in the vicinity of the project site. | | Traffic analysis shows an unavoidable but minor effect. No design features proposed. | Less Than Significant | | |

# USER'S GUIDE

## Purpose

The Soledad Mountain Project is an open pit gold mine with additional underground mining potential proposed by Golden Queen Mining Company, Inc. located southwest of the town of Mojave in the County of Kern, California. This Administrative Draft EIR/EIS has been prepared by the U.S. Bureau of Land Management (BLM) and Kern County (County) after initial circulation of the document with the appropriate Notice of Preparation and Notice of Intent.

A Draft EIR/EIS will be prepared and circulated for public review and comment. A Final EIR/EIS will be prepared to respond to public comments and describe the disposition of issues raised in the comments received on the Soledad Mountain Project Draft EIR/EIS. The Final EIR/EIS will also address developments in the planning of the project facilities, mitigation measures, and reclamation occurring as a result of the environmental review process.

## Format

1. This Administrative Draft EIR/EIS has been prepared in compliance with the BLM and County guidelines for the National Environmental Policy Act and the California Environmental Quality Act. The proposed Soledad Mountain Project is described in detail in Section 2.0. This detailed description is divided into a discussion of the project setting and the project characteristics.

2. The affected environment, the environmental impacts, and mitigation measures for the Soledad Mountain Project are addressed in Section 3.0 for each affected environmental category.

3. Project alternatives are analyzed in Section 4.0. This analysis includes a No Action Alternative.

4. Statutory sections required by CEQA are addressed in Section 5.0.

5. Lists of agency personnel and consultants involved in preparation of this document are provided in Section 8.0 Lists of acronyms, abbreviations and definitions are provided in Section 9.0.

6. The Executive Summary and Comments Section (Section 6.0) are not addressed in this Administrative Draft EIR/EIS. These sections are to be completed after receipt of public comments following circulation of the Draft EIR/EIS and are to be included in the Final EIR/EIS.

**References**

1. References are provided in Section 9.0, detailing the sources of information utilized in the preparation of this Environmental Review.

2. The descriptions and analyses in this Administrative Draft EIR/EIS are based on a comprehensive body of data and information derived from technical studies, engineering reports, and project permit applications. Appropriate information has been incorporated to allow assessment of the potential for significant environmental impacts of project implementation, following guidelines provided in NEPA and CEQA implementing regulations. Various technical documents identified in this Environmental Review are attached as appendices.

# 1.0 INTRODUCTION

This document is an Administrative Draft Environmental Impact Report (EIR)/Environmental Impact Statement (EIS) which has been jointly prepared by the Kern County Planning Department (Kern County) in conjunction with the United States Department of the Interior, Bureau of Land Management (BLM). This document is intended to fulfill the requirements of both the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA). Pursuant to 40 CFR, 1502.13, the purpose and need of the proposed project must be addressed in an Environmental Impact Statement (EIS).

The purpose of the Proposed Action is to construct and operate mining, ore processing, and project support facilities to recover precious metals (gold and silver) from the Soledad Mountain mineral resource. The Proposed Action will occur on and within fee lands, mining leases, patented mining claims and unpatented mining claims owned and/or controlled by Golden Queen Mining Company, Inc. (Golden Queen).

The need to be met by the Proposed Action is the market demand for precious metals and construction aggregates.

Golden Queen's objective in this action is to recover precious metals in a manner that is environmentally responsible and in compliance with applicable laws and regulations while optimizing precious metals production, maximizing the utilization of the resource and meeting the financial expectations of its shareholders.

Kern County's objective relative to the Proposed Action is compliance with the Kern County General Plan, to provide employment opportunities in the county, and to facilitate other regional socioeconomic benefits of project development in an environmentally responsible manner that is consistent with other plan elements and the Surface Mining and Reclamation Act, codified as California Public Resources Code (PRC) Section 2710 et seq.

The BLM's objective relative to the Proposed Action is to meet federal laws, regulations, and policies related to the development of mineral resources on public lands and its environmental management responsibilities. The BLM has, through land use plans, managed the subject lands under multiple use policy, allowing access to mineral rights and mining, subject to Title 43 Code of Federal Regulations (CFR) Section 3809 requirements.

### 1.1 Intent of CEQA/NEPA

Projects subject to CEQA and NEPA are covered by Title 14, California Code of Regulations (CCR), Sections 15220 - 15228, which establish preparation of joint documents. The guidelines for implementation of CEQA are contained in Title 14 CCR, Sections 15000 -15387. The purposes of CEQA are to:

- Inform public agency decision-makers and members of the public regarding the potential significant environmental impacts of proposed activities.
- Identify ways to avoid or significantly reduce these impacts.
- Prevent significant, avoidable damage to the environment by requiring project changes, alternatives, or mitigation measures which are technically, legally, economically, socially and environmentally feasible.
- Disclose to the public the reasons why a public agency decides to approve a project if the project will cause significant environmental impacts.

Under NEPA, 40 CFR, Sections 1500 - 1508, federal agencies are required to:

- Develop methods and procedures which will ensure that environmental resources may be given appropriate consideration in decision making, along with economic and technical considerations.

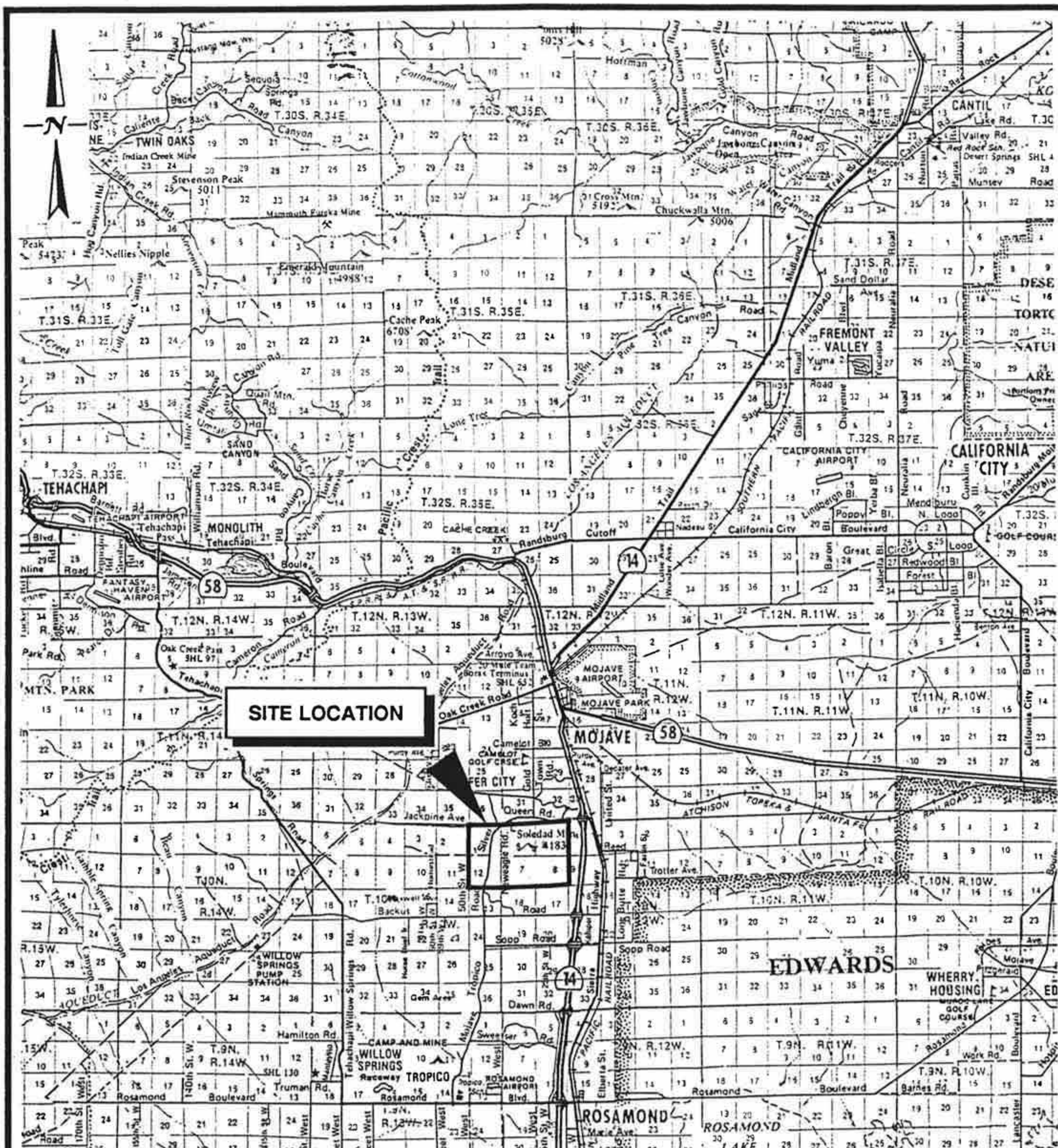
- Utilize a systematic and interdisciplinary approach in the review and evaluation of the proposal.
- Make diligent efforts to involve the public in the process and to provide for public disclosure of proposed actions on public land, the analyses of these proposals and alternatives, and the BLM decision regarding the proposal.

### 1.2 Nature and Background of the Project

Golden Queen is proposing to construct and operate the Soledad Mountain Project, an open pit precious metals (gold and silver) mining and heap leach ore processing project at Soledad Mountain. Gold will be recovered using conventional cyanide leaching and a combination of Merrill-Crowe and carbon adsorption gold recovery technology.

The project area is located approximately five miles southwest of the town of Mojave in Kern County, California, as shown in Exhibit 1.2-1. The Proposed Action includes: construction of project facilities; mining and processing precious metals ores; stockpiling of overburden materials; sale of overburden materials (as aggregate and construction materials); and reclamation of the project site.

CEQA defines a project to include the whole of an action which has the potential for resulting in a physical change in the environment. With respect to this definition, the Proposed Action includes provision for the continued discovery of currently foreseeable resources within the project boundaries as the project is developed and operated. The proposed project has been designed for and the impacts evaluated based upon the foreseeable ore reserve of 60 million tons.




KERN COUNTY, CALIFORNIA

0 Miles 2mi. 4mi. 6mi.

0 Kilometers 5km 10km

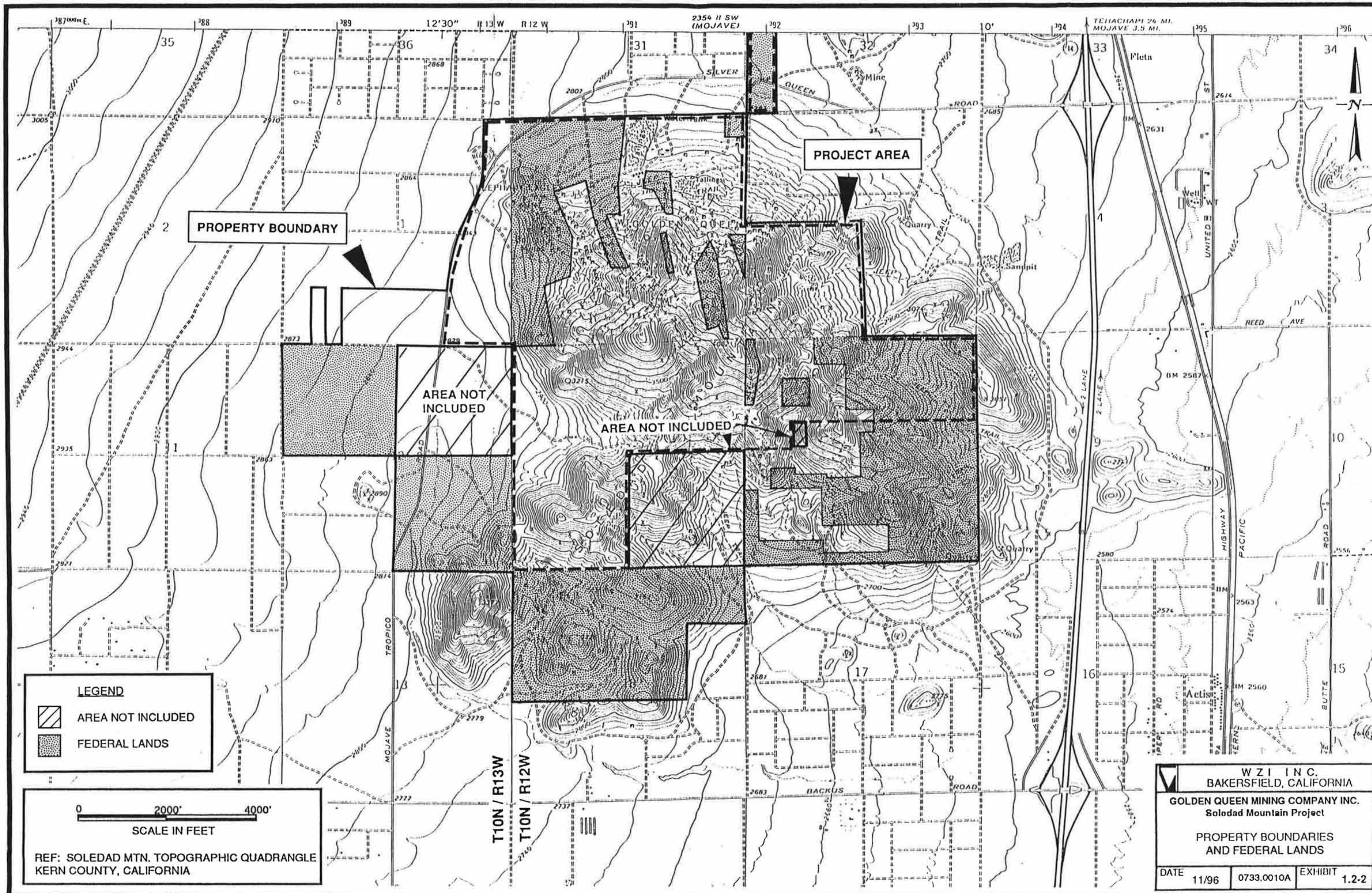
| | |
|---|---|
| WZI INC. BAKERSFIELD, CALIFORNIA | |
| GOLDEN QUEEN MINING COMPANY INC. Soledad Mountain Project | |
| LOCATION MAP | |
| DATE 11/96 | 0733.0010 |
| EXHIBIT 1.2-1 | |

The project area is approximately 1,600 acres, of which 1,165 acres are private land and 435 acres are unpatented mining claims on public lands administered by the BLM (Exhibit 1.2-2). A total of approximately 930 acres of surface disturbance could occur if the Proposed Action is approved; 735 acres on private land and 195 acres on public land.

The proposed project is based upon the mining of a reasonably foreseeable total of 290 million tons of combined ore and overburden materials, with the potential for the sale of some overburden for aggregate and construction material use. Based upon a reasonably foreseeable total ore reserve of up to 60 million tons and a mining rate of up to 6 million tons of ore per year, mining operations at the project will be expected to continue for up to 15 years. The proposed Soledad Mountain Project includes interconnected open pit mining areas within the boundaries of the planned open pit mine, four overburden material piles, two heap leach pads, and associated processing and support facilities.

Construction is anticipated to begin in 1997 and require nine to twelve months to complete. Mining operations would begin in 1998 and could continue until about 2013. Processing operations would begin in 1998 and could continue until approximately the year 2015, at which time the project could begin closure and reclamation. During the development of the open pit mine, it is expected that higher grade vein mineralization will be exposed within the pit walls. Some of these structures may be amenable to mining by underground methods with access from the pit. If this occurs, additional mining of the resource by underground methods may be anticipated.

The entire Soledad Mountain Project site and surrounding area, totaling approximately 9,600 acres, is included in the Specific Plan for Soledad Mountain - Elephant Butte & Vicinity - South of Mojave (Appendix I). This Specific Plan was prepared in March 1973 and adopted by the Kern County Board of Supervisors as Resolution 73-485 on June 18, 1973. Gold and silver mining operations are recognized in the Specific Plan as important past land uses and protection of potential commercial value ores and deposits



PROPERTY BOUNDARY
PROJECT AREA
AREA NOT INCLUDED
AREA NOT INCLUDED
LEGEND
AREA NOT INCLUDED
FEDERAL LANDS
0 2000' 4000'
SCALE IN FEET
REF: SOLEDAD MTN. TOPOGRAPHIC QUADRANGLE
KERN COUNTY, CALIFORNIA
T10N / R13W
T10N / R12W
W Z I INC.
BAKERSFIELD, CALIFORNIA
GOLDEN QUEEN MINING COMPANY INC.
Soledad Mountain Project
PROPERTY BOUNDARIES
AND FEDERAL LANDS
DATE 11/96
0733.0010A
EXHIBIT 1.2-2

incorporated through restriction of incompatible land uses. The proposed project is consistent with the Specific Plan for the general vicinity of the project site and previous land use.

### 1.3 Type of Environmental Review

This Administrative Draft EIR/EIS has been prepared by Kern County in conjunction with the BLM in accordance with the Memorandum of Understanding (MOU) between Kern County and the Bureau of Land Management (Appendix II). This Administrative Draft EIR/EIS assesses the potential environmental effects of the Soledad Mountain Project as proposed by Golden Queen and addresses both CEQA and NEPA concerns.

Open pit mining operations which use cyanide heap leaching processes to produce gold or other precious metals require an EIR (CEQA §21151.7). This document was prepared in accordance with CEQA guidelines for the preparation of an EIR (Title 14 CCR, 15000-15387), Kern County guidelines for the preparation of an EIR, BLM mining regulations (43 CFR, 3809), the Council of Environmental Quality's regulations for implementing NEPA (40 CFR, 1500-1508), and BLM guidelines for implementing NEPA (USDI, 1988). This Administrative Draft EIR/EIS was prepared with the assistance of a third party contractor, WZI Inc. (WZI), using information gathered from Kern County and BLM files; conversations with Kern County and the BLM resource personnel; information gathered from other federal agencies, state agencies, local agencies, and public literature; and information provided by Golden Queen and its consultants.

A Notice of Intent (NOI) to prepare an EIS was published in the Federal Register on March 28, 1996. A Notice of Preparation (NOP) of an EIR was distributed by Kern County on June 18, 1996. Copies of the NOI, NOP and NOP distribution are included in Appendix III. Public scoping meetings were held in Rosamond on April 16, 1996 and in Mojave on April 17, 1996. Comments received as a result of distribution of the NOI and NOP and during public scoping are addressed in this Administrative Draft EIR/EIS. The written comments are included in Appendix III.

This Administrative Draft EIR/EIS analyzes:

1) The environmental impacts of the Proposed Action, including 930 acres of surface disturbance within the 1,600 acre project boundary;
2) The proposed Reclamation Plan for the surface disturbance within the project area;
3) Mitigation measures which reduce impacts to the environment; and
4) The identified potential alternatives to the Proposed Action and a No Action Alternative.

This Administrative Draft EIR/EIS also evaluates the cumulative impacts on the environmental resources of the Mojave - Rosamond area.

The Soledad Mountain Project is required to comply with the Surface Mining and Reclamation Act (SMARA) and State Mining and Geology Board regulations regarding the reclamation of mining operations on lands within the State of California. These regulations relate to: mining operation and closure; end land use; environmental setting; geotechnical requirements; erosion and sediment control; resoiling and revegetation; and administrative requirements.

Impacts of the mining operation will be addressed by conditions of approval associated with the Lead Agency's (Kern County) approval of the Conditional Use Permit (CUP) for the project. These conditions, if not specifically addressed by SMARA or other federal, state or county regulations, will appear as mitigation measures to the development of the project or as specific conditions of approval to ensure compliance with SMARA and Chapter 19.100 (Surface Mining Operations) of the Kern County Zoning Ordinance. All required conditions will be identified in a resolution adopted by the hearing body at a regularly scheduled public hearing. The environmental document, resolution, and staff report, in addition to any material contained therein, will constitute the Lead Agency's response to comments received from the California Department of Conservation/Division of Mines and Geology (DMG).

The proposed operations must also comply with the standards and procedures in the BLM regulations for surface management of public land being mined under the general mining law (43 CFR, 3809). These regulations recognize the statutory right of mineral claim holders to explore and develop federal mineral resources, and encourage such development. The federal regulations require the BLM to review proposed operations to ensure that: 1) adequate provisions are included to prevent unnecessary or undue degradation of public lands; 2) measures are included to provide for reclamation; and 3) the proposed operations comply with other applicable federal, state and local laws and regulations.

### 1.4 Format and Content

This document is organized in a manner which facilitates review and understanding of the Proposed Action and alternatives by the various reviewing agencies and the public. The format includes: Executive Summary; Introduction/Regulatory Framework; Proposed Action and Alternatives; Affected Environment, Environmental Impacts, and Mitigation Measures; Alternatives; CEQA Statutory Sections; Comments and Response to Comments; Mitigation Monitoring Program; Report Preparation; and Technical Appendices.

Executive Summary - This section provides a brief project description, major conclusions, a description of any controversial issues, a description of each significant impact with proposed mitigation measures, and a summary of the unavoidable adverse project impacts and other issues to be resolved by the Lead Agency.

Introduction /Regulatory Framework - This section contains brief discussions of the material contained in the document and provides readers with an overview of the CEQA/NEPA process, an overview of the organization and structure of the Environmental Review document, and a brief description of the project.

Proposed Action and Alternatives - The Proposed Action portion of this section includes a description of the basic characteristics of the project, including its: objectives; location; technical, economic and environmental characteristics; size and design; implementation schedule; and a list of reviewing agencies and required discretionary approvals. The Alternatives portion proposes for consideration a reasonable range of alternatives to the project which could: (1) reduce to less than significant environmental impacts associated with the Proposed Action, (2) achieve the basic project objectives, and (3) be technically and economically feasible. Included within the alternatives considered is a No Action alternative.

Affected Environment, Environmental Impacts, and Mitigation Measures - This section examines the setting, direct and indirect impacts, the irreversible/irretrievable commitment of resources, the cumulative impacts, the recommended mitigation, and the residual impacts of the Proposed Action for each environmental area associated with the project, including:

- Mineral Resources
- Physiography and Geology
- Soils
- Hydrology
- Air Quality and Meteorology
- Biology
- Cultural and Historical Resources
- Paleontological Resources
- Visual Resources
- Noise
- Land Use
- Recreation
- Socioeconomics
- Health Hazards and Public Safety
- Traffic and Transportation

Alternatives - The Alternatives section examines in detail the alternatives considered and found to be appropriate for additional review. It evaluates the impact of each of the alternatives on each of the project environmental resources, and includes a discussion of any mitigation measures which may be associated with an alternative. It includes a detailed evaluation of the No Action alternative and a comparison of the impacts of the alternatives to those of the Proposed Action.

CEQA Statutory Sections - This section includes assessments of short term uses versus long term productivity, growth inducing impacts, and a summary of environmental impacts of the proposed project.

Comments and Response to Comments - This section is reserved for preparation after the circulation of the draft document with the appropriate draft EIR/EIS notifications.

Mitigation Monitoring Program - This section will present a program to monitor and demonstrate compliance with the mitigation measures developed to avoid potentially significant impacts and specific conditions of approval associated with the CUP. It will be prepared at the appropriate time and incorporated in this section.

Report Preparation - The Report Preparation section contains a listing of the participants responsible for preparation of this document and the individuals, organizations, and agency representatives contacted during the preparation of the Environmental Review.

Glossary and References - This section contains definitions of technical terms and acronyms used in the document, and a list of references cited.

Technical Appendices - The Technical Appendices section includes various supporting technical reports.

## 1.5 Decision Making Process

CEQA - There are three basic CEQA compliance tracks: (1) projects exempt from CEQA are subject to few if any analytical or public participation requirements; (2) projects which are not exempt from CEQA but which will not cause significant adverse environmental impacts are subject to simplified analytical and public participation requirements, concluding with the issuance of a Negative Declaration; and (3) projects which will, or may, result in significant environmental effects are subject to extensive analytical and public participation requirements, including the issuance of a Draft EIR and Final EIR. Kern County is the Lead Agency for preparation of this Administrative Draft EIR/EIS under CEQA and is operating as the coordinator for preparation of the NEPA document under the MOU between Kern County and the BLM.

Open pit mining operations which use cyanide heap leaching processes to produce gold or other precious metals require an EIR (CEQA §21151.7). The EIR process entails a full and detailed disclosure of the environmental impacts of the proposed project, potentially feasible mitigation measures to reduce these impacts, and potentially feasible project alternatives.

An EIR consists of two documents: a Draft EIR, which is circulated to solicit comments from the public and other government agencies; and a Final EIR, which consists of responses to comments on the Draft EIR and modifications to the Draft EIR. If an agency makes substantial changes to the project or decides to present significant new information following issuance of the Draft EIR, the agency must then recirculate a revised Draft EIR for additional public review and comment.

The final step in the CEQA process is the requirement that agencies adopt findings to document the agencies' rationale for approving the proposed project with respect to the environmental analysis presented in the EIR. CEQA requires that agencies must find that: 1) the project will have no significant environmental impacts; 2) the project may have significant impacts, but these impacts can be reduced to a less than significant

level by mitigation measures that can and should be implemented; and/or 3) the project will result in significant impacts, but there are specific social, economic or other overriding considerations justifying project approval.

An EIR provides an important opportunity for public participation and informed public agency decisions relating to proposed projects, plans and regulatory programs. CEQA compliance is significantly enhanced by the establishment and maintenance of sound working relationships with all concerned parties, including the community, the media and the project sponsor. By using the CEQA process to address environmental impacts and take public concerns into account, public agencies can comply with CEQA's legal requirements and establish a process that both encourages and benefits from public involvement.

NEPA - There are five basic steps to completing the NEPA process:

1) Scoping
2) Data collection
3) Documentation of the Environmental Analysis
4) Decision documentation
5) Project implementation and monitoring

The MOU between Kern County and the BLM encourages preparation of a joint document to minimize duplication of effort and paperwork. This document is prepared in accordance with the MOU and will address those items specific to NEPA which are not covered in the CEQA process.

Early in the process, a clearly defined proposed action must be described in writing. Adequate environmental analysis can not begin until the proposal and any alternatives have been clearly defined. At this time, mitigation measures which can be built into the project should also be considered.

A brief project description was prepared and was reviewed with agency staff personnel in the BLM Ridgecrest Office and in the Kern County Planning office. These review meetings resulted in recognition of Kern County Planning as the Lead Agency for preparation of this document under the MOU, with Mr. Ahmed Mohsen of the BLM office in Ridgecrest being selected as the Project Lead responsible for the NEPA analysis.

All proposed actions on or affecting public lands or resources under BLM jurisdiction fall into one of five categories:

1) actions which are exempt from NEPA.
2) actions which are categorically excluded.
3) actions which are covered by an existing NEPA environmental document.
4) actions which require preparation of an Environmental Assessment to determine if preparation of an EIS is required.
5) actions which require preparation of an EIS.

The BLM's decision to prepare an EIS for the Soledad Mountain Project is based on the BLM's policy to reduce paperwork and streamline the permitting process through the production of a combined EIR/EIS under the MOU.

### 1.6 Responsible Agency List

Kern County Planning is the Lead Agency for preparation of this Environmental Review under CEQA and under the MOU. A list of persons/agencies consulted has been identified by Kern County and the BLM and is included in Section 8.2.

### 1.7 Applicable Permits and Approvals

This section summarizes the legislative and regulatory framework which, in addition to NEPA and CEQA guidelines, would be addressed as part of the Soledad Mountain Project. Various aspects of the Soledad Mountain Project must be in compliance with

applicable federal and state environmental requirements. Numerous different acts, codes, rules, and regulations have been identified.

It is anticipated that the permits listed in Table 1.7-1 will be required for the Soledad Mountain Project:

### 1.7.1 Air Quality

Construction and operation of the Soledad Mountain Project will be subject to federal, state and local rules and regulations, as implemented through provisions of the Clean Air Act of 1971, pertaining to the control of air pollutants. Region IX of the United States Environmental Protection Agency has federal jurisdiction over the area, and the California Air Resources Board (CARB) is responsible at the state level. At the local level, the Kern County Air Pollution Control District (KCAPCD) has authority over sources of air pollutants. CARB serves as technical review and advisory agency, providing technical advice to KCAPCD when necessary, and offering guidance when KCAPCD regulations are not sufficiently detailed to address a particular situation. CARB has retained authority over mobile sources in California but has delegated much of the control of stationary sources to local agencies.

KCAPCD has fulfilled federal requirements that allow a local agency to administer federal Clean Air Act policies. Thus, KCAPCD will have primary regulatory authority over potential sources of air pollution associated with the Soledad Mountain Project.

**TABLE 1.7-1**
**Permits Required for the Soledad Mountain Project**

| AGENCY/DEPARTMENT | PERMIT/APPROVAL |
|---|---|
| FEDERAL AGENCIES | |
| Bureau of Land Management | Plan of Operations |
| | Cultural/Paleontological Resource Permit (National Historic Preservation Act, 16 USC 47) |
| Fish and Wildlife Service | Section 7 Consultation |
| Bureau of Alcohol, Tobacco and Firearms | Purchase, Storage, or Transportation of Explosives Permit |
| Environmental Protection Agency | Toxic Chemical Release Inventory System |
| Mine Safety and Health Administration | Mine Identification Number |
| STATE AGENCIES | |
| State Water Resources Control Board Regional Water Quality Control Board | General Construction Activity Storm Water Permit |
| | Waste Discharge Permit |
| California Department of Fish and Game | Consultation |
| State Office of Historic Preservation (SHPO) | Section 106, (National Historic Preservation Act, 16 USC 470): Designation, survey, determination of effect |
| California Occupational Safety and Health Administration (Cal OSHA) | Construction Permit |
| | Explosive Blaster's License |
| | Process Safety Management Program |
| KERN COUNTY | |
| Planning Department | Environmental Report |
| | Mining/Reclamation Plan and Financial Assurance |
| | Conditional Use Permit |
| | Grading Permit |
| | Road Encroachment/Road Vacation |
| | Building Permit |
| Environmental Health | Sewage Disposal System Permit/Water Well Drilling Permit |
| Fire Department | Hazardous Materials Business Plan |
| | Hazardous Materials Inventory |
| | Fire Protection Plan |
| Air Pollution Control District | Authority to Construct |
| | Permit to Operate |

#### 1.7.1.1 The Federal Clean Air Act

The Clean Air Act was established in an effort to ensure that minimum levels of air quality are maintained in all areas of the United States. These minimum levels are termed National Ambient Air Quality Standards (NAAQS) and were established as a result of the provisions of the Clean Air Act of 1970. The NAAQS are legal limits on the allowable ambient levels of air pollution. Pollutants for which NAAQS have been established are nitrogen dioxide ($NO_2$), sulfur dioxide ($SO_2$), carbon monoxide (CO), suspended particulate matter less than 10 microns in aerodynamic diameter ($PM_{10}$), and ozone ($O_3$). These are often termed "criteria pollutants."

There are primary and secondary NAAQS. The primary standards are intended to reflect levels of air quality deemed necessary to protect the public health, incorporating an adequate margin of safety. The secondary standards reflect the levels of air quality necessary to protect public welfare from any other known or anticipated adverse effects of a pollutant (e.g., effects to wildlife or visibility). Most areas of the United States were required to attain the primary standards no later than December 31, 1982, with conditional extensions to 1987 granted to certain problem areas. The national standards may be equaled continuously or exceeded once per year. National standards for suspended particulate matter are 150 $\mu g/m^3$ on a 24-hour average.

National standards for fine particulate matter ($PM_{2.5}$) were proposed in November 1996 at levels of 15 $\mu g/m^3$ - annual average and 50 $\mu g/m^3$ - 24-hour average. These standards will not be finalized until June 1997. In addition, the analytical and technical tools for evaluating $PM_{2.5}$ emissions and concentrations are still being developed. Thus, for this project, evaluation of the impacts of $PM_{2.5}$ is not required.

Under the Clean Air Act, state and local authorities were given primary responsibility for assuring that their respective regions were in attainment of the NAAQS or had a verifiable Attainment Plan to achieve them. This provision also gave state and local agencies authority to promulgate more stringent ambient air quality standards. In California, CARB has promulgated its own set of California Ambient Air Quality

Standards (CAAQS). There is no deadline for attainment of the CAAQS. However, the Air Quality Attainment Plan must allow for a 5 percent reduction in annual VOC, CO and $NO_2$ emissions in nonattainment areas, until the state standards for these pollutants are achieved. Kern County Southeast Desert is currently classified nonattainment for ozone, thus, the 5 percent reduction per year is required for VOC and $NO_2$ emissions. KCAPCD has submitted the required "Reasonable Further Progress" Plan for achieving the requisite reductions.

The CAAQS were established in 1969 as a result of the Mulford-Carrell Act. In addition to the national standards pollutants, California also established standards for visibility reducing particles, sulfates, hydrogen sulfide, and vinyl chloride. California standards for ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, and $PM_{10}$ are not to be exceeded, while the remaining California standards can not be equaled or exceeded. California standards for suspended particulate matter are 50 $\mu g/m^3$ on a 24-hour average.

The pollutants and their corresponding national and state ambient air quality standards are shown in Table 1.7-2.

The Clean Air Act Amendments made in 1977 require each state to identify geographic areas in compliance with the national standards as well as those areas that are not in compliance. These designations are known as the "attainment" status designations. Areas not in compliance with the national standards are termed "nonattainment" and are subject to New Source Review (NSR) regulations. Areas meeting the national standards are referred to as "attainment" and are subject to Prevention of Significant Deterioration (PSD) and NSR regulations. Areas with insufficient data to make a determination are "unclassified" but are treated as "attainment" areas until proven otherwise. The designation of an area is made on a pollutant-specific basis. Therefore, it is possible to be located in an area designated nonattainment for one pollutant, but attainment or unclassified for other pollutants.

## TABLE 1.7-2 STATE AND FEDERAL AMBIENT AIR QUALITY STANDARDS

| Pollutant | Averaging Time | California Standards [1] | | National Standards [2] | | |
|---|---|---|---|---|---|---|
| | | Concentration [3] | Method [4] | Primary [3,5] | Secondary | Method [7] |
| Ozone | 1 Hour | 0.09 ppm (180 µg/m3) | Ultraviolet Photometry | 0.12 ppm (235 µg/m3) | Same as Primary Std | Ethylene Chemiluminescence |
| Carbon Monoxide | 8 Hour | 9.0 ppm (10 mg/m3) | Non-Dispersive Infrared Spectroscopy (NDIR) | 9 ppm (10 mg/m3) | | Non-Dispersive Infrared Spectroscopy (NDIR) |
| | 1 Hour | 20 ppm (23 mg/m3) | | 35 ppm (40 mg/m3) | | |
| Nitrogen Dioxide | Annual Average | | Gas Phase Chemilumi-nescence | 0.053 ppm (100 µg/m3) | Same as Primary Std | Gas Phase Chemilumi-nescence |
| | 1 Hour | 0.25 ppm (470 µg/m3) | | | | |
| Sulfur Dioxide | Annual Average | | Ultraviolet Fluorescence | 80 µg/m3 (0.03 ppm) | | Pararosaniline |
| | 24 Hour | 0.04 ppm (105 µg/m3) | | 365 µg/m3 (0.14 ppm | | |
| | 3 Hour | | | | 1300 µg/m3 (0.5 ppm) | |
| | 1 Hour | 0.25 ppm (655 µg/m3) | | | | |
| Suspended Particulate Matter ($PM_{10}$) | Annual Geometric | | Size Selective Inlet High Volume Sampler and Gravimetric Analysis | | | Inertial Separation and Gravimeteric Analysis |
| | 24 Hour | 50 µg/m3 | | 150 µg/m3 | Same as Primary Std. | |
| | Annual Arithmetic | | | 50 µg/m3 | | |
| Sulfates | 24 Hour | 25 µg/m3 | Turbidimetric Barium Sulfate | | | |
| Lead | 30 Day Average | 1.5 µg/m3 | Atomic Absorption | | | Atomic Absorption |
| | Calendar Quarter | | | 1.5 µg/m3 | Same as Primary Std. | |
| Hydrogen Sulfide | 1 Hour | 0.03 ppm (42 µg/m3) | Cadmium Hydr-oxide STRactan | | | |
| Vinyl Chloride (chloroethene) | 24 Hour | 0.010 ppm (26 µg/m3) | Tedlar Bag Collection, Gas Chromatography | | | |
| Visibility Reducing Particles [8] | 8 Hour (10 am to 6 pm, PST) | In sufficient amount to produce an extinction coefficient of 0.23 per kilometer due to particles when the relative humidity is less than 70 percent. Measurement in accordance with ARB Method V. | | | | |

Source: CALEPA, 1992.

1. California standards for ozone, carbon monoxide, sulfur dioxide (1 hour), nitrogen dioxide, visibility - reducing particles, and particulate matter - $PM_{10}$, are values that are not to be exceeded. The sulfates, lead, hydrogen sulfide, and vinyl chloride standards are not to be equaled or exceeded.
2. National standards, other than ozone and those based on annual averages or annual arithmetic means, are not to be exceeded more than once a year. The ozone standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above the standard is equal to or less than one.
3. Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25° C and a reference pressure of 760 mm of mercury. All measurements of air quality are to be corrected to a reference temperature of 25° C and a reference pressure of 760 mm of mercury (1,013.2 millibar); ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.
4. Any equivalent procedure which can be shown to the satisfaction of the Air Resources Board to give equivalent results at or near the level of the air quality standard may be used.
5. National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health. Each state must attain the primary standards no later than three years after that state's implementation plan is approved by the Environmental Protection Agency.
6. National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant. Each state must attain the secondary standards within a "reasonable time" after the implementation plan is approved by the EPA.
7. Reference method as described by the EPA. An "equivalent method" of measurement may be used but must have a "consistent relationship to the reference method" and must be approved by the EPA.
8. This standard is intended to limit the frequency and severity of visibility impairment due to regional haze and is equivalent to a 10-mile nominal visual range when relative humidity is less than 70 percent.

Federal PSD regulations require that the maximum allowable increase in total suspended particulate in a Class I wilderness area resulting from emissions from a major stationary source is 5 $\mu g/m^3$ (annual geometric mean) and 10 $\mu g/m^3$ (24-hour maximum). Federal major stationary source PSD regulations apply to specific named facilities emitting, or having the potential to emit, 100 tons per year or more of any pollutant subject to regulation under the act or any facility emitting, or having the potential to emit, 250 tons per year or more of any pollutant subject to regulation under the act. Fugitive emissions are not counted towards the emissions quantification for PSD.

The Southeast Desert Air Basin, where the Soledad Mountain Project site is located, is an area that is in attainment or unclassified (due to a lack of data) for all NAAQS and all CAAQS except the state 24-hour $PM_{10}$ standard and the state and federal 1-hour ozone standard.

Federal and California laws also regulate emission and notification requirements related to air toxics (or hazardous air pollutants), some of which are typically emitted by precious metal mining operations. California's Air Toxics "Hot Spots" Information and Assessment Act (AB2588) requires specified facilities to submit comprehensive air toxics emission inventory plans and reports to local air pollution control districts, and, if necessary, to conduct health risk assessments for approximately 350 toxic substances identified by AB2588. In addition to requiring such an inventory, AB2588 established standards and requirements for health risk assessments and public notification of possible health risks.

Part of the New Source Review process includes the evaluation of Best Available Control Technology (BACT) for individual processes. BACT is defined as the most stringent control technique or limitation that has been achieved in practice for the same class of source, or is contained in an approved implementation plan, or is both technologically feasible and cost effective. BACT is required for all pollutants expected to be emitted from a new emissions unit.

#### 1.7.1.2 KCAPCD Rules and Regulations

KCAPCD is empowered to regulate stationary sources of air pollutant emissions in such a manner that the region within its jurisdiction either attains, or is projected to attain, the NAAQS for all criteria pollutants. Should it become clear that any part of the region is moving away from attainment of the standards, KCAPCD will implement corrective measures to bring the region back into attainment or towards attainment. These could include measures such as lowering net emissions and creating more stringent air pollution control regulations. In certain instances, these regulations could be retroactive and require existing emission sources to conform to the new regulations.

Emissions from sources of any contaminant for which there is a NAAQS are governed by KCAPCD rules and regulations. These rules and regulations include New Source Review as part of a permitting process whereby new or modified sources of emissions are evaluated for adequate controls and compliance with federal, state and local regulations.

### 1.7.2 Water Quality

#### 1.7.2.1 The Federal Clean Water Act

The Clean Water Act regulates discharges to surface waters from all types of sources. Discharges to surface water are subject to the requirements of a National Pollutant Discharge Elimination System (NPDES) permit, which ensures that the water meets applicable standards at the point of discharge. The NPDES provisions are contained in Section 402 of the Clean Water Act. In California, control of surface water discharges in accordance with the Clean Water Act is delegated by EPA to the State Water Resources Control Board (SWRCB) and ultimately, the Regional Water Quality Control Board (Lahontan Regional Board).

Section 404 of the Clean Water Act regulates discharge of dredged or fill material into waters of the United States. Permitting of these types of discharges occurs under the authority of the Corporation of Engineers. The definition of "waters of the United States"

is included in 33 CFR, 328.3 which, in part, states that they include "...lakes, rivers, streams [including intermittent streams], mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce..."

#### 1.7.2.2 The Federal Safe Drinking Water Act

The Safe Drinking Water Act establishes minimum national drinking water standards and guidelines for protecting groundwater. Both primary and secondary standards are specified for drinking water. Primary standards are established for the protection of human health and set Maximum Contaminant Levels (MCLs) for a variety of inorganic and organic substances. Secondary standards are intended as guidelines and are not federally enforceable. They are established primarily for aesthetic purposes such as color and taste.

The Safe Drinking Water Act is enforced at the state and local level by the SWRCB and the Lahontan Regional Board, through water quality protection regulations, and by the California Department of Health Services (DHS) and the local County Department of Environmental Health Services through regulation of drinking water systems.

#### 1.7.2.3 California Water Code

The state enforces federal water quality protection programs for which they have been delegated authority under the California Water Code and implementing regulations. The Porter-Cologne Water Quality Control Act (Water Code Sections 13000 to 14076) provided a comprehensive statewide system for water pollution control that included designation of the SWRCB and nine Regional Boards, covering the entire state. Local jurisdiction over water quality is also provided. Under the Porter-Cologne Act, the SWRCB is responsible for adopting water quality standards as required to fulfill the state's responsibilities under the Clean Water Act. In addition to surface water discharge permitting requirements of the Clean Water Act, the Porter-Cologne Act regulates discharges and potential discharges to groundwater.

Any person proposing to discharge waste that could affect the quality of waters of the state must file a Report of Waste Discharge with the Lahontan Regional Board. The Lahontan Regional Board may permit discharges that comply with the Clean Water Act and the Porter-Cologne Act, subject to issuance of waste discharge requirements to protect the quality of waters of the state.

Standards more stringent than required under these laws may be required in waste discharge requirements, if needed to implement water quality control plans and to protect beneficial water uses.

The Regional Boards regulate water resources under federal and state antidegradation policies (40 CFR, Section 131.12 and State Water Resources Control Board Resolution 68-16), regional water quality control plans, and other applicable policies and regulations. The project site is located in the northern part of the Antelope Valley in an area encompassed by the South Lahontan Basin Water Quality Control Plan, which was adopted in 1975 and amended several times. Designated beneficial uses of water in the Antelope Valley are identified in this plan and are further discussed in Section 3.4.

#### 1.7.2.4 California Code of Regulations Title 23

The SWRCB, and ultimately the Regional Boards, regulate systems or activities that have the potential to discharge contaminants to surface or groundwaters. The review and permitting process for mining facilities follow requirements Title 23 CCR, Chapter 15, Article 7 (Mining Waste Management). Article 7 also provides the Regional Board with the authority for adoption of waste discharge requirements to protect the waters of the state from contamination.

### 1.7.3 Biological Resources

#### 1.7.3.1 Federal Endangered Species Act

The Endangered Species Act (Act) of 1973, as amended, extends legal protection to plants and animals listed as endangered or threatened by the U.S. Fish and Wildlife

Service (Service). The Act authorizes the Service to review proposed federal actions to assess potential impacts to "listed" species.

Listed species are those which are threatened or endangered (in danger of extinction throughout all or a significant portion of their range) and which have been the subject of final regulation and listing in the Federal Register, and those species officially proposed for listing in a Federal Register Notice.

Federal status lists are overseen by the Service and are defined as follows:

Endangered

Any species which is in danger of extinction throughout all or a significant portion of its range other than a species of the Class Insecta determined by the Secretary to constitute a pest whose protection under the provisions of this Act would present an overwhelming and overriding risk to man.

Threatened

Any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

Proposed

Species for which a general notice and a proposed regulation for listing have been published in the Federal Register.

Candidate

Those species for which the Service has on file sufficient information on biological vulnerability and threat(s) to support issuance of a proposed regulation for listing in the Federal Register but issuance of the proposed regulation is precluded.

Previously, federal status lists included categories for Candidate species. The species which were in Category 1 are, for the most part, on the Candidate list. Species in Categories 2 and 3 are no longer on a list. However, species which were formerly listed in a Category may be considered as species of concern.

Section 7, the interagency portion of the Endangered Species Act, requires federal agencies, in consultation with the Service, to ensure "that any action authorized, funded, or carried out by such agency...is not likely to jeopardize the continued existence of any listed species or result in the destruction or modification of [critical] habitat."

#### 1.7.3.2 California Endangered Species Act and Native Plant Protection Act

The California Endangered Species Act (CESA) of 1984 and the Native Plant Protection Act of 1977 (NPPA) are administered by the California Department of Fish and Game (CDFG). Maintaining priority within the various lists is the function of the California Natural Diversity Data Base, which is also maintained by CDFG.

The CDFG maintains lists of plant and animal species which are designated to be endangered, threatened, rare, or candidates. The designations are defined as follows:

Endangered

> A native California bird, mammal, fish, amphibian, reptile or plant (species or subspecies) is **endangered** when it is in serious danger of becoming extinct throughout all, or a significant portion of, its range due to one or more causes, including loss of habitat, change of habitat, over-exploitation, predation, competition or disease (Section 2062, Fish and Game Code).

Threatened

> A native California bird, mammal, fish, amphibian, invertebrate, reptile or plant (species or subspecies) is **threatened** when, although not presently threatened with extinction, it is likely to become an endangered species in the foreseeable future in the absence of special protection and management efforts. Any animal listed as "rare" by the Commission on or before January 1, 1985 is now included as a "threatened" species (Section 2067, Fish and Game Code).

Rare

A native California plant (species, subspecies or variety) is **rare** when, although not presently threatened with extinction, it is in such small numbers throughout its range that it may become endangered if its present environment worsens (Section 1901, Fish and Game Code). Since 1985 this designation applies to plants only.

Candidate

A native California species or subspecies of a bird, mammal, fish, amphibian, reptile or plant is a **candidate** when the Fish and Game Commission has formally noticed it as being under review by the Department to determine whether listing as threatened or endangered is warranted, or when it is the subject of a proposed rulemaking by the commission to list as threatened or endangered (Section 2068, Fish and Game Code).

Section 15380(d) of the Guidelines states that a species not listed as endangered, threatened or rare in Title 14 CCR, (Sections 670.2 or 670.5) or 50 CFR, (Sections 17.11 or 17.12) "shall nevertheless be considered to be rare or endangered if the species can be shown to meet the criteria in subsection (b)."

Section 15065 of the CEQA guidelines specifies that "A Lead Agency shall find that a project may have a significant affect on the environment and thereby require an EIR to be prepared..." if the project has" ...the potential to reduce the number or restrict the range of a rare or endangered plant or animal..." Appendix G of the CEQA implementing guidelines indicates that "A project will normally have a significant effect on the environment if it will substantially effect a rare or endangered species of animal or plant or the habitat of the species." These concepts are utilized in the vegetation and wildlife impacts significance criteria presented in Section 3.0.

#### 1.7.3.3 BLM Sensitive Species List

BLM California sensitive plant and wildlife species are designated by BLM's California State Director. The purpose of the designation is to provide increased management attention to prevent population and habitat declines that might result in federal or state listing as endangered or threatened. No particular habitat population management action is required or prohibited by the "sensitive" species designation.

#### 1.7.3.4 Federal Migratory Bird Treaty Act

The Migratory Bird Treaty Act (16 USC 701-718h) makes no provision for the killing of migratory birds without a permit. All birds are considered migratory birds under the Migratory Bird Treaty Act with the exception of three: English sparrow (*Passer domesticus*), starlings *(Sturnus vulgaris)*, and barnyard pigeons *(Columba livia)*. A zero mortaility objective regarding wildlife shall be maintained. Migratory bird deaths associated with cyanide heap leaching processes would come under the jurisdiction of this statue. Any mining operation which repeatedly or negligently fails to prevent migratory bird mortality could be federally prosecuted.

#### 1.7.3.5 West Mojave Coordinated Management Plan

The West Mojave Coordinated Management Plan is a proposed multi-agency habitat conservation plan covering nearly 9.5 million acres of California desert lands. It involves a regional planning and management framework to conserve species habitats and to foster economic development. The plan is currently in preparation for an EIR/EIS Administrative Review draft. The Soledad Mountain project site is not included in any core reserve, specialty reserve or habitat linkage corridor in the current draft.

Additionally, the federal lands contained within the Soledad Mountain project site are designated for land exchange under the Western Mojave Land Tenure Adjustment Project Record of Decision, January 1991.

### 1.7.4 Cultural Resources

#### 1.7.4.1 National Historic Preservation Act (Section 106)

The National Historic Preservation Act of 1966, as amended, established: (1) a National Register of Historic Places to be maintained by the Secretary of the Interior; (2) the position of State Historic Preservation Officer; and (3) the Advisory Council on Historic Preservation. Section 106 requires federal agencies to provide the State Historic Preservation Officer and the Advisory Council on Historic Preservation an opportunity to comment on any project on federal lands within their state that would affect properties included in or eligible for inclusion in the National Register of Historic Places. Section 304 directs federal agencies to withhold from disclosure to the public information relating to the location or character of eligible properties whenever disclosure of such information may create risk or harm to such resources. National Register of Historic Places eligibility criteria are specified in 36 CFR, Part 60.4.

The advisory council regulations outline procedures to be followed by federal agencies (51 Federal Register, 31118; 9/2/86). Federal agencies are required to consult with the State Historic Preservation Officer to determine if a proposed undertaking encompasses any property included in or eligible for inclusion in the National Register of Historic Places. For each eligible property identified, the federal agency must determine if the proposed undertaking would have an effect. If there could be an effect, the Criteria of Adverse Effect are applied, and treatment measures are developed for resources that would be adversely affected.

Within the statutory constraints (National Historic Preservation Act Section 304 and Archaeological Resources Protection Act of 1979, Section 9), the advisory council regulations encourage participation by local governments, Native American tribes, and the public. Within this context, comments on the Soledad Mountain Project are sought from Kern County, the local Native Americans, archaeologists, historians, and other groups or individuals concerned with cultural resources.

#### 1.7.4.2 CEQA Archaeological Guidance

CEQA Guidelines, Appendix K, Archaeological Impacts, provides guidance for the identification, evaluation, and mitigation of archaeological properties that may be affected by a proposed project. Additionally, Appendix K contains detailed procedures for determining the significance, or lack thereof, of a proposed project on a cultural resource. Only impacts on "unique" or "important" cultural resources can be considered significant in terms of the potential effects of a proposed project (PRC Section 21083.2).

The terms "unique" and "important" are interchangeable when referring to cultural resources within a proposed project area under CEQA review. PRC Section 21083.2 uses the term "unique," while CEQA Guidelines, Appendix K uses the term "important."

Guidelines for treatment of the cultural resources on federal lands are established by BLM and the "Secretary of Interior's Standards and Guidelines, Archeology and Historic Preservation" (Federal Register 48 (190):44716-44742; 29 September 1983).

### 1.7.5 Other Regulations for Environmental Protection

#### 1.7.5.1 Toxic Release Inventory Program

On October 17, 1986, the President signed into law the Superfund Amendments and Reauthorization Act of 1986 (SARA). Title III of SARA contains authorization relating to emergency planning, notification, community right-to-know, and a toxic release inventory. The toxic release inventory (TRI) program was codified February 16, 1988 as 40 CFR, Part 372 et seq. The basic intent of the TRI program is to make available to the public information about releases of certain chemicals into the air, water and land that result from certain facilities within their communities. It contains provisions which allow the public to consistently track pollution prevention measures undertaken by individual facilities. Currently, 40 CFR, Part 372 applies to facilities with Standard Industrial Classification (SIC) codes that begin with the first two digits of 20 through 39 and have the equivalent of 10 or more full time employees.

On June 27, 1996, EPA proposed (Federal Register 33588/Vol. 61, No. 125) to add seven new industrial groups to the TRI program. Metal mining, with SIC codes that begin with 10, are included as one of the seven major industrial groups proposed for addition. To assure that the public and other interested parties may review and comment, EPA was accepting comments on the proposed rule until September 4, 1996. EPA believes that the addition of these industrial groups to the TRI program will significantly add to the public's right-to-know about releases and other waste management activities of toxic chemicals in their communities.

TRI reporting will be required for metal mining facilities, with 10 or more employees, that manufacture, process, or otherwise use threshold quantities of any listed chemicals or chemical categories established under the TRI program. These covered facilities will be required to submit annual reports on their releases, transfers, and other management practices for more than 650 chemicals listed under the TRI regulations. The data contained in the report will be compiled and made available to the public through a variety of means, including a report issued by EPA.

If a facility meets the established threshold for a chemical, the owner/operator must report all releases for that chemical throughout the facility regardless of which threshold (manufacture, process, otherwise use) was exceeded. Releases to the environment include emissions to the air, discharges to surface waters, onsite releases to land, underground injection wells and quantities of materials sent offsite for recycling or disposal. Reportable releases also include both routine and accidental releases.

If the manufacturing, process, or otherwise use threshold has been exceeded for a certain chemical, then the TRI program requires reporting of releases of that chemical to EPA. EPA has developed Form R to fill out and report for each chemical release. If a facility does not exceed the threshold for any of the reportable chemicals and release reporting is not required, then that facility should retain documentation onsite to be able to demonstrate that reporting was not required for that reporting year.

If a facility "manufactures" or "processes" 25,000 pounds per year of any listed chemical or chemical category, or if a facility "otherwise uses" 10,000 pounds per year of any listed chemical or chemical category, then the quantity thresholds are met and a report is required for that calendar year.

When this regulation was enacted there were more than 300 chemicals and 20 chemical categories. EPA may add or delete chemicals from the list, which it has, and the current list now contains over 650 chemicals.

#### 1.7.5.2 Resources Conservation and Recovery Act

The Resource Conservation and Recovery Act (RCRA) of 1976 requires federal and state agencies to promulgate regulations implementing standards for handling hazardous waste materials. Regulations applicable to generators of hazardous waste are included in 40 CFR, Parts 260, 261, 262 and 266. California is authorized to implement a hazardous waste program that, at a minimum, must be at least as stringent as the federal standards. State hazardous waste standards are included in Title 22 CCR, which is administered by the California Department of Toxic Substances Control.

# 2.0 PROPOSED ACTION AND ALTERNATIVES

The Proposed Action and proposed project design features which mitigate potential environmental effects, as presented here, represent the **Preferred Alternative**, which is also the **Environmentally Superior Alternative**. The Preferred Alternative contains provisions for the reclamation of previously disturbed (by others) areas which occur within the project boundary.

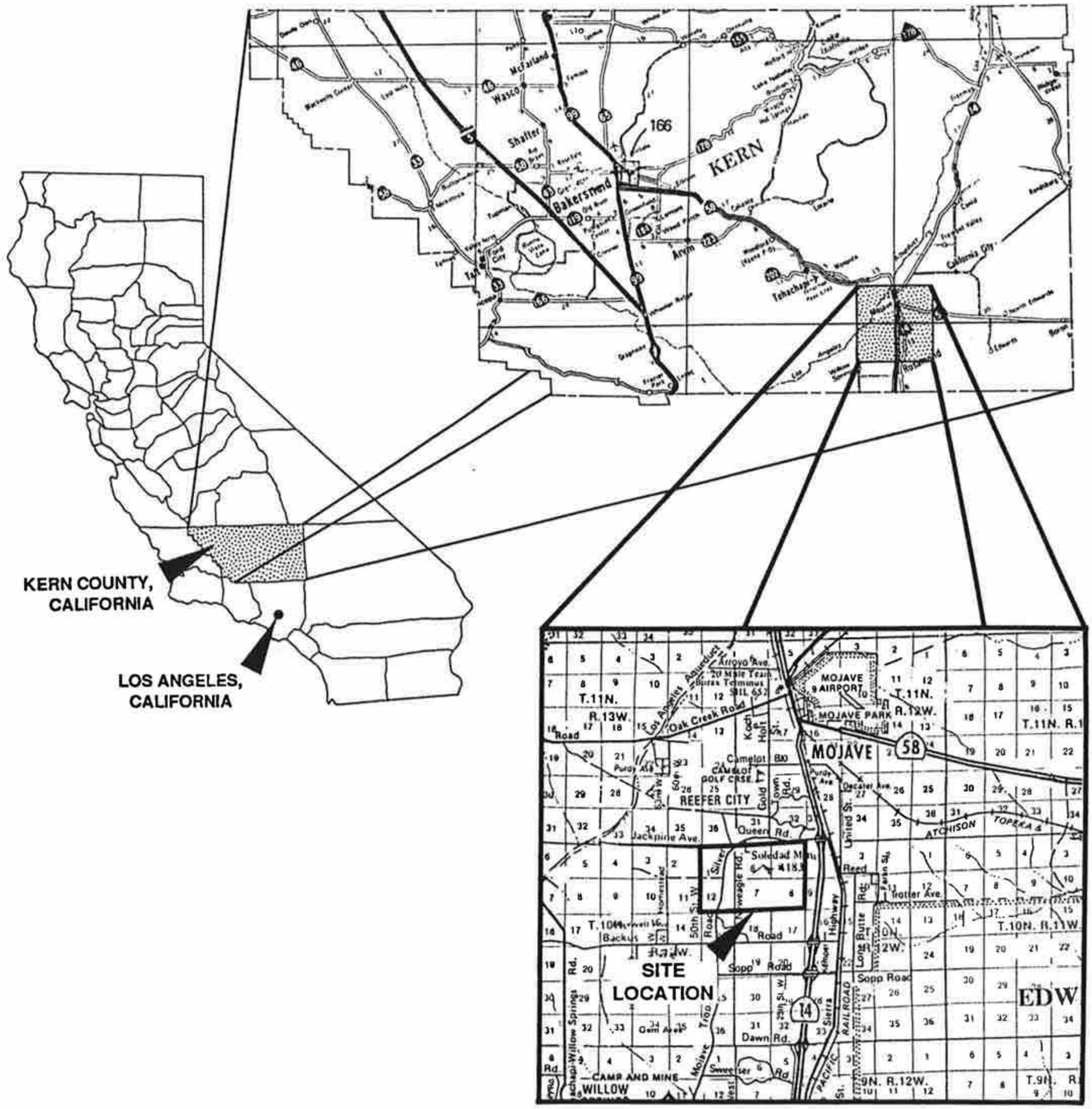
The Proposed Action has been designed to accomplish Golden Queen's basic objectives for the Soledad Mountain Project, which include the following:

- Develop a commercial mine to recover precious metals from the orebody.
- Efficiently design and manage the project to optimize precious metals recovery and meet the financial expectations of the shareholders.
- Minimize surface disturbances and mitigate other potential environmental effects.
- Perform reclamation that will return the site to a state that is consistent with surrounding land uses following mining.
- Construct, operate, and reclaim the site in a manner consistent with federal, state, and local laws and regulations.

## 2.1 Setting

### 2.1.1 Regional Location

The project is located in the western Mojave Desert within the unincorporated area of eastern Kern County, California (Exhibit 2.1-1). The topography of the western Mojave Desert in the area of the site varies from relatively flat alluvial areas to steep mountains. Elevations vary from approximately 2,000 feet above mean sea level in the flat alluvial




N

| WZI INC. BAKERSFIELD, CALIFORNIA | | |
|---|---|---|
| **GOLDEN QUEEN MINING COMPANY INC.** **Soledad Mountain Project** | | |
| REGIONAL LOCATION MAP | | |
| DATE 11/96 | 0733.0010 | EXHIBIT **2.1-1** |

covered areas to over 5,000 feet above mean sea level in some of the mountainous areas.

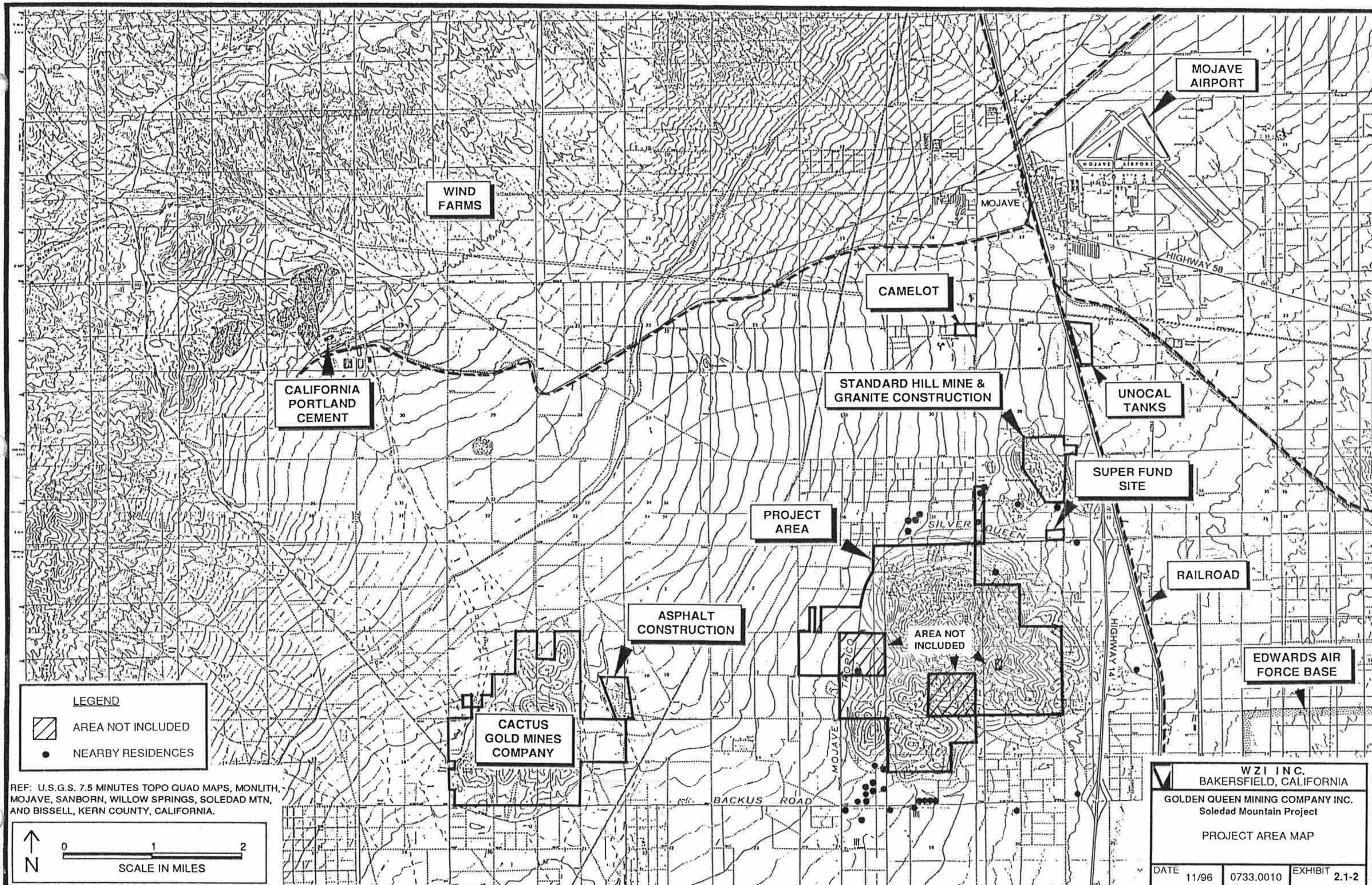
The site is located approximately 5 miles southwest of Mojave, an unincorporated town of approximately 4,000 people situated at the intersection of State Route 58 and State Route 14. The Mojave airport stores and repairs jets for various operators. Industrial facilities in Mojave include chemical plants and recycling facilities. In the higher elevations to the northwest of the site are several hundred wind turbines generating electricity. Edwards Air Force base is located east of the project and occupies a large portion of the desert floor (Exhibit 2.1-2).

The unincorporated town of Rosamond, with a population of approximately 22,000 people, is located approximately 7 miles to the south adjacent to State Route 14.

The Tehachapi Mountains lie approximately 10 miles west and northwest of the project site. The Tehachapi Mountains form a natural barrier that separates the San Joaquin Valley from the desert portions of Kern County. The San Gabriel Mountains lie approximately 20 miles southwest of the project site and form a natural barrier that separates the Mojave Desert from the Los Angeles area. Distances to the nearest urban centers include Bakersfield, approximately 49 miles northwest, Lancaster, approximately 22 miles south, and Los Angeles, approximately 62 miles southwest.

### 2.1.2 Project Location

The project area is on and around Soledad Mountain, west of State Route 14 and south of Silver Queen Road. The project area includes portions of Sections 5, 6, 7, and 8 in Township 10 North, Range 12 West and Sections 1 and 12 in Township 10 North, Range 13 West, San Bernardino Base and Meridian (SBBM) (Exhibit 2.1-2). Golden Queen has acquired control of approximately 2,840 acres, including the project site.



MOJAVE AIRPORT
MOJAVE
HIGHWAY 58
WIND FARMS
CAMELOT
CALIFORNIA PORTLAND CEMENT
STANDARD HILL MINE & GRANITE CONSTRUCTION
UNOCAL TANKS
SUPER FUND SITE
PROJECT AREA
SILVER QUEEN
RAILROAD
ASPHALT CONSTRUCTION
AREA NOT INCLUDED
HIGHWAY 14
EDWARDS AIR FORCE BASE
MOJAVE TROPICO
CACTUS GOLD MINES COMPANY
BACKUS ROAD
LEGEND
AREA NOT INCLUDED
NEARBY RESIDENCES
REF: U.S.G.S. 7.5 MINUTES TOPO QUAD MAPS, MONLITH, MOJAVE, SANBORN, WILLOW SPRINGS, SOLEDAD MTN, AND BISSELL, KERN COUNTY, CALIFORNIA.
N
0
1
2
SCALE IN MILES
WZI INC.
BAKERSFIELD, CALIFORNIA
GOLDEN QUEEN MINING COMPANY INC.
Soledad Mountain Project
PROJECT AREA MAP
DATE 11/96
0733.0010
EXHIBIT 2.1-2

The topography of the project area consists of rugged outcrops and ridges with intervening drainages which grade to alluvial slopes and flat areas on the flanks of Soledad Mountain. The elevation of the project area varies from 4,190 feet above mean sea level at the peak of Soledad Mountain to approximately 2,700 feet above mean sea level along the northeast flank.

The project is situated in an area covered by the Kern County General Plan and the Specific Plan for Soledad Mountain - Elephant Butte and Vicinity - South of Mojave. The plan allows for the development of residential areas with a minimum lot size of ½ acre as well as mining and processing of gold and silver ores.

The area surrounding the project is sparsely populated. There are approximately fifteen residences located along Backus Road south of Soledad Mountain. Five residences are north of Soledad Mountain on the north side of Silver Queen Road. A tract of land east of the project site, referred to as Goldtown, is designed as a residential area. One house has been constructed in Goldtown, but has not been certified for occupancy and is not expected to receive certification. One house is located on Mojave-Tropico Road directly west of the project area.

The Camelot housing development is located 2.5 miles directly north of the project area and consists of 109 lots on approximately 15 acres. Development began in 1986; all lots have been developed. A golf course is located next to the development and less than 10 additional homes are located on the north side of the golf course outside the development.

Access to the site is from Silver Queen Road, an existing, paved county road. Silver Queen Road is an east-west road which runs approximately 600 feet north of the project site. Golden Queen's entrance road will intersect Silver Queen Road near the eastern boundary of Section 6, Township 10 North, Range 12 West, SBBM, directly opposite Gold Town Road (Exhibit 2.1-3).

PROPERTY BOUNDARY
AREA NOT INCLUDED
AREA NOT INCLUDED
SILVER QUEEN ROAD
GOLD TOWN ROAD
NEW EAGLE ROAD (COUNTY ROAD 990)
SR 14
BACKUS ROAD
MOJAVE TROPICO ROAD
T10N / R13W
T10N / R12W
Standard Hill
Fleta
Water Tank
Quarry
Sandpit
REED AVE
HIGHWAY
PACIFIC
UNITED ST
LEGEND
AREA NOT INCLUDED
0
2000'
4000'
SCALE IN FEET
REF: SOLEDAD MTN. TOPOGRAPHIC QUADRANGLE
KERN COUNTY, CALIFORNIA
N
WZI INC.
BAKERSFIELD, CALIFORNIA
GOLDEN QUEEN MINING COMPANY INC.
Soledad Mountain Project
ACCESS ROAD MAP
DATE 11/96
0733.0010
EXHIBIT 2.1-3

New Eagle Road, a county road, currently extends into the project area in the northwest ¼ of Section 6, Township 10 North, Range 12 West, SBBM (Exhibit 2.1-3). New Eagle Road was created as a public road by order of the Board of Supervisors of Kern County in 1937 and was recorded in Minute Book 39, Page 487 of the Board of Supervisors. New Eagle Road intersects Silver Queen Road in the south ½ of Section 31, Township 11 North, Range 12 West, SBBM and travels in a southerly direction approximately 0.41 miles to the base of Soledad Mountain in Section 6, Township 10 North, Range 12 West, SBBM. Silver Queen Road and New Eagle Road are clearly visible in the lower left portion of Exhibit 2.2-2 in Section 2.2.2. New Eagle Road terminates at the base of Soledad Mountain and does not connect to any existing roads and cannot be used by the general public to travel past its terminus in Section 6. The Soledad Mountain project includes vacating that portion of New Eagle Road within Section 6, Township 10 North, Range 12 West, SBBM.

The Golden Queen project area lies within the Bureau of Land Management's Western Mojave Land Tenure Adjustment Project. There are 522,000 acres of public lands within the 2.8 million acres included within the Land Tenure Adjustment project boundary. The purpose of the Land Tenure Adjustment Project is to consolidate BLM land holding into manageable blocks through voluntary exchange with privately owned land. The project intends to release 105,000 acres of public lands and acquire 255,000 acres of public lands through land exchanges. The BLM has established three zones or area classifications to assist in accomplishing the goal of the Land Tenure Adjustment Project Area. The three zones are consolidation, disposal and retention zones.

The consolidation zone is an area in which the BLM seeks to acquire private land that is intermingled with public lands in an effort to form manageable blocks of land. The disposal zone is comprised of scattered public lands interspersed with private holdings. The BLM has determined that the public lands in the disposal zone provide the least opportunity for successful public management. The public land within the disposal zone is designated for exchange with land in the consolidation zone. The retention zones represent areas where the BLM desires to retain the public land. The Golden Queen project is located within the area classified as a "disposal zone."

Golden Queen plans to cooperate and work with the BLM towards the accomplishment of the Land Tenure Adjustment Project's objectives in the Soledad Mountain Project area. Golden Queen plans to acquire lands within the designated retention and consolidation zones, or in other areas acceptable to the BLM, in exchange for lands designated for disposal within the Soledad Mountain Project boundaries.

## 2.2 Project Characteristics

### 2.2.1 Proposed Action

Golden Queen is a wholly owned United States subsidiary of Golden Queen Mining Company, Ltd. (incorporated in November 1985). Golden Queen has headquarters in Spokane, Washington, and local offices at the project site. In addition to its own holdings of private land and mineral claims, Golden Queen has mining and mineral rights agreements with 76 landowners associated with the Soledad Mountain Project.

Golden Queen is proposing to construct and operate an open pit precious metals mine and heap leach recovery operation on Soledad Mountain. Aggregate and construction materials will be a marketable by-product.

#### 2.2.1.1 Approximate Start

The project is scheduled to begin construction in mid-1997 or as soon as permitting is completed. Construction will be completed within twelve months, with a projected start of operations in 1998.

#### 2.2.1.2 Construction

Construction activities for the Soledad Mountain Project will include:

- improving site access and creation of a construction staging area;
- building access and haulage roads to the open pit mining areas and other site facilities;
- preparation of the initial open pit mine production areas;

- site preparation and construction of crushing, conveying and agglomeration facilities;
- site preparation and construction of the heap leach solution processing and precious metals recovery plant;
- site preparation and installation of the first phase of the heap leach pad liner and leak detection system; and
- site preparation and construction of parking, office, maintenance and other ancillary facilities.

#### 2.2.1.3 Operations

The projected operating life of the project is approximately 15 years at a mining rate of up to 30 million total tons per year, of which up to 6 million tons per year may be ore. The actual operating life will be determined based on economic conditions and further delineation of the ore body during operations. The project will be staffed on a 24 hours per day, 7 days per week basis.

A number of ore production areas will be developed within the overall open pit mine, with operations being conducted at several locations during any day. As development of the mine progresses the potential for underground mining of suitable mineralized structures will be evaluated. Overburden piles will be developed at designated sites as the development of the mining operation progresses. Ore will be hauled by truck from the mine to the crushing and agglomeration facility, where it will be crushed and agglomerated in preparation for heap leach processing. Overburden will be hauled by truck to the overburden piles. It is expected that a portion of the overburden will be sold from the site for use as aggregate and construction materials.

Crushed and agglomerated ore will be conveyed and stacked on heap leach pads for leaching of the precious metals from the ore. Two heap leach pads will be built. The first, which will be constructed in phases as the operation progresses, will ultimately be supplanted by a second pad when the initial pad is stacked to capacity. For the second heap leach pad, trucking of agglomerated ore to the pad may be proposed as an alternative to conveying.

Precious metals leach solutions will be pumped from the pads to the process and recovery plant, where the precious metals will be recovered from solution, smelted, and shipped to an offsite refiner.

Water required for dust control and evaporation make-up will be obtained from water supply wells at an average rate of 750 gallons per minute.

The Soledad Mountain project will be regulated by the federal Mine Safety and Health Administration and the California Occupational Health and Safety Administration. Both of these agencies publish and enforce regulations designed to promote the creation and maintenance of a safe and healthy work environment for the company's employees and visitors. The project will be designed and operated to meet or exceed the standards appropriate for the project with respect to the requirements of both agencies.

#### 2.2.1.4 Work Force

Short-term personnel needs for project construction activities are anticipated to be approximately 250 people. The work will be performed by a combination of contractor employees and company employees.

Long-term personnel requirements for project operations are expected to be approximately 230. The average number of employees per shift is expected to be 35 to 40. Local residents are expected to comprise up to 80 percent of the work force.

#### 2.2.1.5 Closure and Reclamation

Operations will be followed by closure and reclamation of the site according to the Reclamation Plan as discussed in Section 2.2.5. The objectives of reclamation are to ensure that the site is left in a condition that:

- Allows use consistent with pre-mining and current land use plans;
- Does not pose a threat to public health and safety;
- Protects air and water quality; and
- Encourages establishment of natural vegetation that will provide productive habitat.

The reclamation plan for the Soledad Mountain Project is designed to achieve specific goals to meet the following ultimate objectives:

- Provide a diversity of habitat for post-mining land use;
- Stabilize disturbed surfaces to prevent erosion;
- Ensure that excavated and processed materials will not pose a hazard to public health and safety; and
- Implement a site revegetation program with a long-term goal of establishing a native vegetation community similar to existing conditions.

The majority of the closure and reclamation efforts at the site will begin after the cessation of mining and processing operations. When possible, some areas will begin the reclamation process concurrent with operations when these areas are no longer necessary for operations. In addition to the reclamation of the surface disturbances resulting from project operations, some disturbances within the project site that resulted from earlier exploration, development and mining will be similarly reclaimed.

#### 2.2.1.6 History of Heap Leaching

The first use of cyanide solution for gold extraction occurred in the late 1800's. Until the 1970's, gold extraction by cyanidation was primarily limited to conventional milling operations where ground ore particles are slurried with cyanide solution in tanks or vats. The ore must be finely ground (generally to sand, silt, or clay sized particles) because the retention time in the extraction process is short; usually hours to days. After the gold is removed from the ore particles, the barren ore particles or "tailings" are disposed of as slurry or a dried filter cake in specially designed impoundment areas. Ore processing

using this milling procedure is capital intensive, costly to operate, and is usually economical only for higher grade ores.

It was not until 1969 that large scale heap leaching began to be considered, based on the work of the U.S. Bureau of Mines (EPA, 1988a). Commercial implementation of the process occurred shortly thereafter at a mine in northern Nevada, to extract gold from mineralized rock that was below the current economic cut-off grade for milling. Since the early 1970's, heap leaching facilities have been developed that have ranged from small, intermittent, one-man operations to large, well-capitalized operations capable of average processing rates of 20,000 tons of ore per day and more.

The heap leaching method is suitable for extracting free, disseminated, submicron particles of gold and/or silver in pervious host rock. The heap leaching process can make gold deposits economic that could not be developed using conventional milling due to its substantially lower capital requirement and operating costs. The average ore grade processed by heap leaching is about 0.05 ounces of gold per ton of rock compared to an average grade of 0.09 ounces for conventional milling (EPA, 1988a).

Heap leaching became well established through the 1970's and 1980's due to rising gold prices and its suitability for low grade ore deposits. The engineering design of heap leach operations has been refined over the years to optimize gold recovery and improve environmental protection. Along with the development of heap leaching technology has been the promulgation of laws and regulations to assure that mining companies complete comprehensive engineering designs and adopt operating procedures that minimize the potential for impacts to the environment.

Examples of the technical and regulatory improvements in heap leaching that have occurred over the years include the following:

- Increased sophistication of the engineering and construction of impervious liner systems to prevent gold solution loss, and protect the underlying soil and ground water resources. Coupled with this has been a substantial increase in available synthetic liner and drainage systems. Synthetic liners are generally manufactured from plastic and are referred to as flexible membrane liners. They can be used in place of the more traditional clay liners, or in conjunction with clay liners to construct composite liners, which provide a high level of assurance against leakage.

- Development of engineered drainage systems (e.g. gravel layers and/or perforated piping systems) on the tops of pad liners in order to quickly drain off the solution after it percolates to the bottom of the ore pile. These drainage systems reduce the time required for leaching and reduce the depth of solution (hydraulic head) over the liner, thereby minimizing the potential for leakage. They also increase the stability of the leach pad slopes by minimizing hydrostatic pressures in the stacked ore above the liner.

- State regulations require modern leach pad liners to meet stringent design requirements for a very low permeability and for drainage systems that minimize the hydraulic head on liners. Agency requirements also include extensive quality assurance and quality control checks during construction to assure that liner systems meet the design specifications.

- Regulatory requirements for monitoring systems in the soil under the liner and in the groundwater to confirm that the process solution containment systems are functioning as designed, and that leakage, which could degrade the environment, is not occurring.

- Reductions in the concentration of cyanide in the leaching solution, and improvements in process facility design and operation that maximize the recycling of solution reagents within the process circuit. These developments reduce the potential to impact the environment, and allow more efficient operations due to reduced reagent handling requirements and costs.

- Development of measures that minimize the amount or surface area of solution that is exposed. This reduces the potential for wildlife to be exposed to process reagents, and also reduces evaporation and reagent consumption. Such measures include: 1) designing solution holding ponds as integral, internal features of the leach pads or covering and/or netting the process water ponds; 2) using drip emitters to apply process solution to the top of the leach pads instead of spray systems; and 3) configuring the solution collection ditches around the edges of the heap leach pads to avoid exposed liquid.

- Rinsing of ore piles after leaching to reduce soluble cyanide and any associated metal concentrations to very low residual levels prior to closure.

Cyanide, like many other materials, is potentially dangerous if misused, but is relatively easy to handle safely. This has been documented through the more than 100 years of experience with cyanide use in mining and milling operations. Cyanide is routinely used in metallurgical operations in the major gold mining areas of the world.

With the application of modern engineering technology and regulatory controls, heap leaching using dilute cyanide solutions can be conducted at the Soledad Mountain Project in a manner that is safe to human health and the environment. Golden Queen will be required to comply with all applicable laws, regulations, rules, mitigation measures and permit conditions to assure that the design, construction, operation, and reclamation are conducted in an environmentally sound manner.

### 2.2.2 Project Design

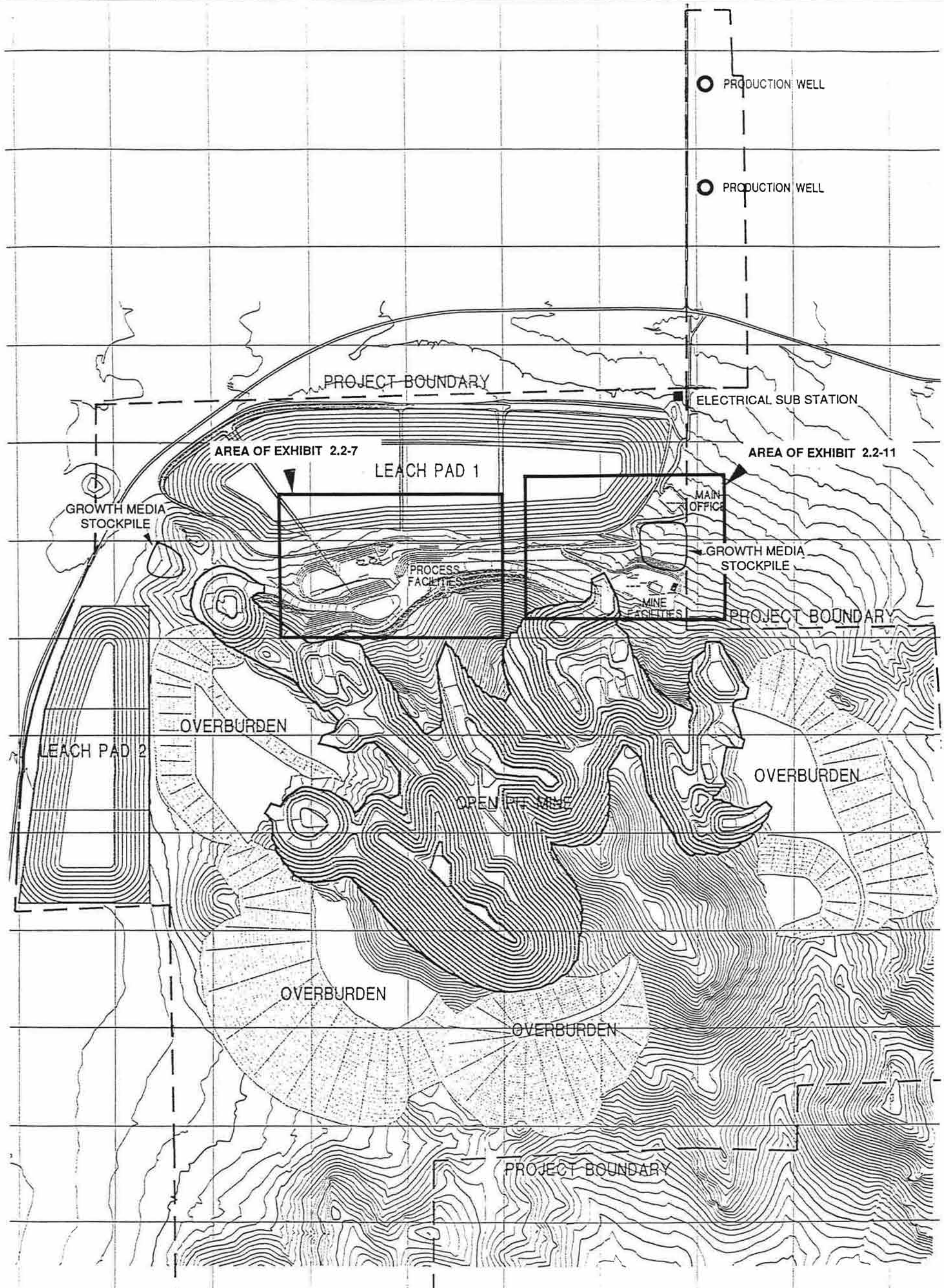
Exhibit 2.2-1 presents a conceptual plot plan for the project and facilities proposed for the site. The drawing illustrates the proposed location of the open pit mine and the proposed locations of the:

- overburden piles;
- heap leach pads;
- ore crushing, agglomeration, conveying and stacking facilities;
- precious metals recovery plant;
- analytical laboratory;
- entrance road, parking, and offices;
- warehouse and maintenance shops; and
- fuel, lubricant, and reagent storage areas.

The project design was formulated to meet several objectives, including:

- minimizing surface disturbance and environmental impacts;
- providing for safe, efficient and economic operations; and
- efficient and timely reclamation.

The project design is based upon state of the art technology in use today for the analysis, development, operation, and reclamation of this type of mining project. The technologies proposed have been proven effective in numerous similar projects around the world, and incorporate into the design of the project the lessons learned through application and experience. The procedures incorporated into the design of this project




0 1000' 2000'

APPROXIMATE SCALE IN FEET

Golden Queen
MINING CO. INC.

SOLEDAD MTN. PROJECT
GENERAL FOOTPRINT MAP

**WZI INC.**
BAKERSFIELD, CALIFORNIA

**GOLDEN QUEEN MINING COMPANY INC.**
**Soledad Mountain Project**

CONCEPTUAL PLOT PLAN

| DATE | | EXHIBIT |
|---|---|---|
| 11/96 | 0733.0010 | 2.2-1 |

build upon this experience to optimize the project and minimize environmental risk. The project is based upon the mining of a reasonably foreseeable total of 290 million tons of ore and overburden materials, with a portion of the overburden expected to be sold for aggregate and construction material use. Based upon a reasonably foreseeable total ore reserve of 60 million tons, and a mining rate of up to 6 million tons of ore per year (up to 30 million tons per year of combined ore and overburden), mining operations at the project will be expected to continue for up to 15 years. The proposed project has been designed for and the impacts evaluated based on the foreseeable ore reserve of 60 million tons.

During the development of the open pit mine, it is expected that higher grade vein mineralization will be exposed within the pit walls. Some of these structures may be amenable to mining by underground methods with access from the pit. If this occurs, additional mining of the resource by underground methods may be anticipated.

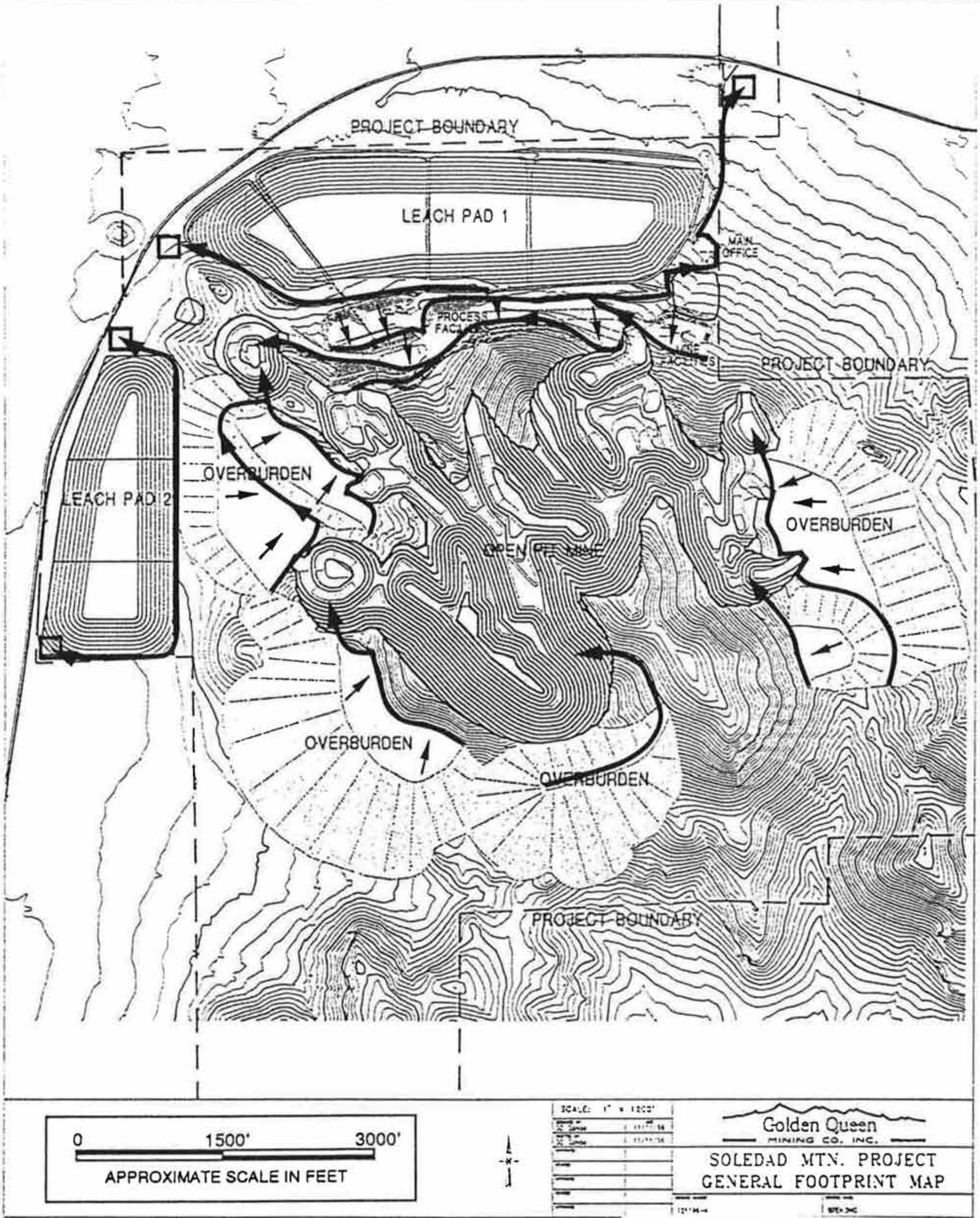
Exhibit 2.2-2 is a low angle, oblique aerial photograph of the project site viewed from the north-northwest. The photograph illustrates the extent of the disturbance resulting from previous activities at the site. The photograph also illustrates the paucity of vegetation that naturally exists at the project site, particularly at elevations above 2,900 feet (roughly where the steep slopes of Soledad Mountain meet the valley alluvial fans).

A Site Grading Plan has been developed in accordance with Kern County regulations and is presented in Appendix IV. This plan provides for safe, stable road and facility design, minimized land disturbance, erosion control through energy dissipation, and direction of storm water runoff away from processing and other mine facilities to sedimentation catchment ponds. The project is designed as a zero discharge facility. The catchment ponds, which will be planted with native vegetation, will encourage the percolation of storm water for soil and groundwater recharge. The settled solids may eventually be used as reclamation growth media. The plan is based upon the 25-year, 24-hour maximum storm event. Exhibit 2.2-3 presents a schematic site drainage profile showing the general features designed to control storm water runoff.


0733.0010

OBLIQUE AERIAL PHOTOGRAPH (Looking South Southeast), JULY 19, 1996

FIGURE 2.2-2




LEGEND

SLOPE AT 1/2%

DIRECTED WATER FLOW

SEDIMENTATION CATCHMENT POND

WZI INC.
BAKERSFIELD, CALIFORNIA

GOLDEN QUEEN MINING COMPANY INC.
Soledad Mountain Project

SCHEMATIC SITE DRAINAGE PROFILE

| DATE 11/96 | 0733.0010 | EXHIBIT 2.2-3 |
|---|---|---|

The choice of sites for location of the overburden piles, heap leach pads, processing facilities, and the remaining ancillary facilities has taken into account, through drilling and examination of surface and underground site geology, the potential for recoverable mineral resources to exist at these sites. The planned location of these facilities should not impact the potential for future mineral development at the project.

The project development, operational, and reclamation plans recognize that occasional upset conditions such as storms, power outages, reagent spills, and equipment breakdowns may occur. Although the project is designed with these disturbances in mind, it will also have, at all times, the operators, mechanics, equipment, supervisional capability, and written procedures onsite to react to unplanned events. Utilization of these resources to respond to upset conditions will have first priority to prevent undue exposure to unplanned or unexpected events.

Reaction to a spill of hazardous, or potentially hazardous materials, will focus upon containment of the material, recovery of the material, recovery of contaminated materials, appropriate disposal of recovered and contaminated materials, treatment or neutralization of affected areas, and testing of affected areas. Reactions to events which are unusual in nature or which may require non-standard procedures will be coordinated with the appropriate agencies. A written plan will specify standard, acceptable procedures and will include procedures for the notification of regulatory agencies.

Access to the project for people and wildlife will be controlled by the erection of fencing around most areas and the utilization of berms and natural topography. The heap leach pads and process plant areas will be enclosed using eight foot high fencing designed to exclude people and animals. The remainder of the fencing will be standard four strand barbed wire.

#### 2.2.2.1 Mine Plan

Conventional open pit mining will be conducted from interconnected areas contained within the planned boundaries of the mine. Mining operations will be conducted 24 hours per day, 7 days per week. Utilizing crews consisting of approximately 25 people, up to

30 million total tons of material will be mined per year, of which up to 6 million tons may be ore. A reasonably foreseeable total of 290 million tons of total material will be mined. Of this total, an ore reserve of 60 million tons is reasonably foreseeable. The proposed project has been designed for and the impacts evaluated based upon this foreseeable ore reserve.

The mining process will consist of the following operations:

- Exploration and development drilling, usually to a depth of 200 to 1,000 feet, to further define and delineate the extent and location of precious metals resources within the project area;

- Drilling blastholes on an engineered grid to allow for placement of the blasting agents within the deposit and the collection of drill cutting samples for assay and mine development;

- Loading of blasting agent, an ammonium nitrate and fuel oil mixture (ANFO), into the blastholes, connecting the detonation equipment, and initiating the blast. Blasting will normally be scheduled to occur once per day, during daylight hours;

- Delineating the blasted ore and overburden materials based upon the blasthole cuttings analyses;

- Loading ore and overburden materials, using wheel loaders, and/or track shovels into off-road haulage trucks; and

- Transporting ore in off-road haulage trucks to the crushing facility and overburden to one of the overburden piles, all of which are located adjacent to the mine.

Ore and overburden piles will be constructed to stable design configurations by dumping haul truck loads directly into place or by dumping near the edge of the pile and using a track dozer to push the material into place.

In order to ensure that blasting procedures do not result in damage or danger to project or neighboring structures, blasting procedures will be designed, conducted and monitored by experienced mining engineers and California certified blasters.

The U.S. Bureau of Mines has conducted extensive research into the effects of blasting upon structures. As a result, they have concluded that a peak particle velocity of less than 2.0 inches per second has a low likelihood of causing damage to structures. Also, they have determined that, if individual detonations of blastholes are greater than 8 milliseconds apart, the effect of individual detonations will not be cumulative.

Based upon this information, a relationship was developed correlating the amount of explosive used in a blast to the distance at which no damage would be expected to occur. This relationship will be applied to all blasting operations at Soledad Mountain. Applying this relationship results in calculated particle accelerations at the Southern California Natural Gas Company pipeline (about 2 miles away) well below US Bureau of Mines recommendations, so no effect is anticipated.

Roads and other operating areas within the project will be maintained by using motor graders and/or wheel dozers to provide optimum road surfaces and by using water trucks to control fugitive dust. Long term and semi-permanent roads and surfaces within the project will be constructed using magnesium chloride (or a similar approved dust palliative) to control dust and reduce road maintenance and water requirements. Mine haul roads will be designed with a maximum slope of 10% and will conform to Mining Safety and Health Act requirements.

Mining equipment will be refueled and lubricated within the mine using specially designed fuel/lubrication trucks or at the fueling station located near the mine maintenance shop. Equipment maintenance, when necessary or appropriate to be done at a location other than the maintenance shop, will be accomplished using mobile mechanic's vehicles, portable welding equipment, and mobile cranes.

Mine shift changes will generally be done within the mine. Miners will be transported to their work site using a passenger bus. Mine supervisors and surveyors will use small vehicles for access to the mine and transportation of people and materials within the mine.

Table 2.2-1 presents the listing of the mining equipment anticipated to be required for the project. All of this equipment is either diesel or gasoline powered.

TABLE 2.2-1
PRELIMINARY MINING EQUIPMENT LIST

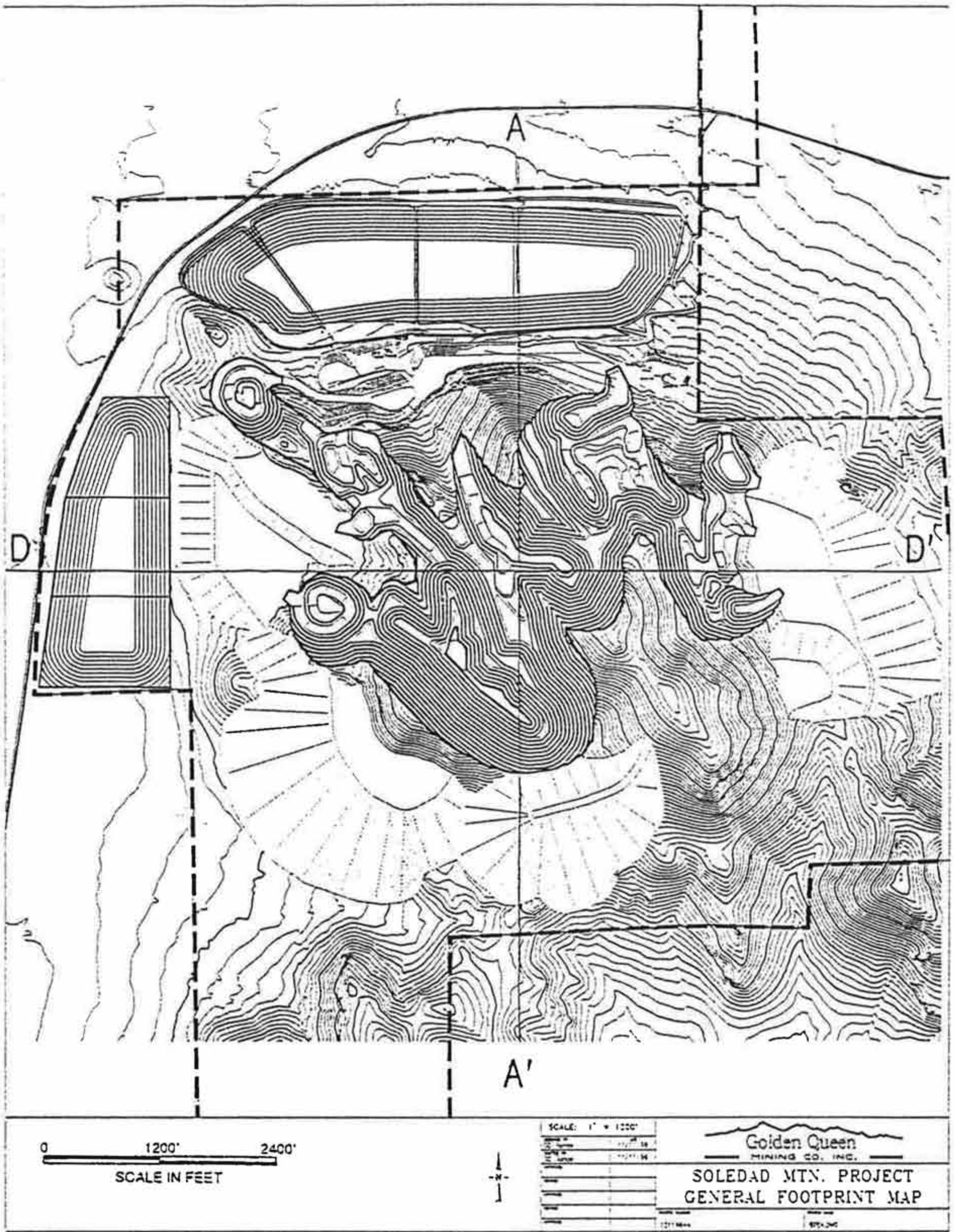
| ITEM | QUANTITY |
|---|---|
| Exploration drills (contracted/seasonal) | 2 |
| Blast Hole Drills | 5 |
| ANFO truck | 1 |
| Wheel loaders | 5 |
| Off-road haul trucks | 13 |
| Track dozers | 4 |
| Water trucks | 2 |
| Motor Grader | 2 |
| Fuel trucks | 1 |
| Maintenance/lubrication trucks | 3 |
| Passenger van | 1 |
| Light plants | 8 |

The mine will be excavated with standard technologies utilizing bench mining methods. Examination by experts in rock mechanics and slope stability has confirmed that a safe and stable mine can be developed utilizing overall highwall slopes of 55 to 63 degrees. Although the ultimate slopes will be developed by mining twenty foot high individual benches, the final slope configuration will consist of sixty foot high vertical intervals with twenty foot wide safety and stability benches. Appendix V presents the slope stability work performed by John Abel Jr., Ph.D, and reviewed by Don Poulter, California Registered Engineer.

Exhibit 2.2-4 is a plan drawing which shows the locations of cross-sections made through the current planned mining areas. Cross-sections A-A' and D-D' are presented here (Exhibits 2.2-5 and 2.2-6). All of the cross-sections are presented in Section 3.2. The actual mine configurations may change somewhat during operation as adjustments are made to adapt to localized conditions that are encountered. As designed, the greatest depth of the mine, measured from the original ground surface to the projected pit bottom, will be about 1,300 feet. The highest point on the mine highwall will be 4,150 feet above mean sea level. The lowest pit bottom elevation will be approximately 2,780 feet above mean sea level. The approximate maximum linear dimensions of the mine area will be 5,600 feet in length and 4,900 feet in width. The existing high point topography of Soledad Mountain will not be altered.

The overburden piles are designed to be built with essentially horizontal tops and thirty-seven degree side slopes. This slope is the approximate natural angle of repose for this material and will be stable under static loading conditions. An engineering stability analysis has been done for these piles by Don Poulter, California Registered Engineer, in the Site Grading Plan. As designed, the aspect of the overburden piles ranges from 300 feet to 600 feet. When reclaimed, the overburden piles will be graded and contoured, with 1.8:1.0 (horizontal to vertical) side slopes.

Golden Queen anticipates that much of the overburden material will be marketable in the form of aggregate and construction materials. Overburden resulting from mining on private lands owned or controlled by Golden Queen may be processed and/or sold as



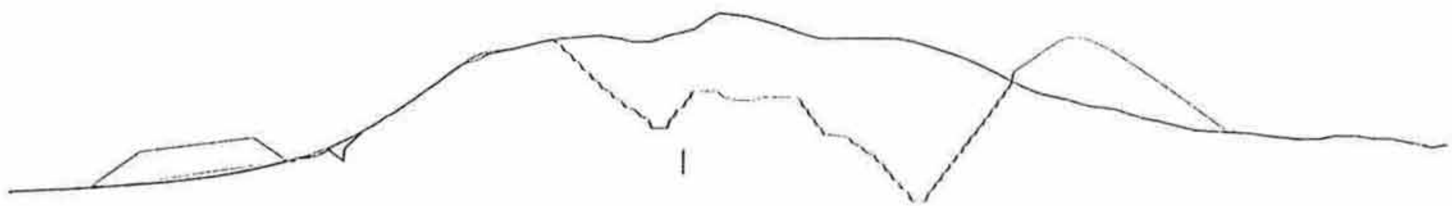

WZI INC.
BAKERSFIELD, CALIFORNIA

**GOLDEN QUEEN MINING COMPANY INC.**
**Soledad Mountain Project**

TOPOGRAPHIC PROFILE
LOCATION MAP

| DATE 11/96 | 0733.0010 | EXHIBIT **2.2-4** |
|---|---|---|

# CROSS SECTION
# A - A'



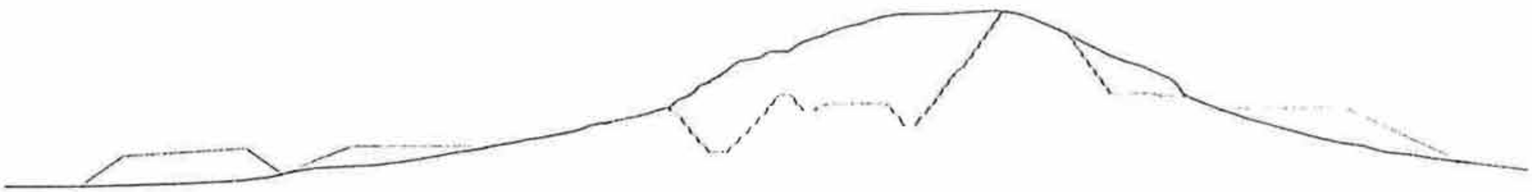
0 1000' 2000'
SCALE IN FEET

Golden Queen
MINING CO. INC.
CROSS SECTION
A - A'

| | |
|---|---|
| WZI INC. BAKERSFIELD, CALIFORNIA | |
| GOLDEN QUEEN MINING COMPANY INC. Soledad Mountain Project | |
| CROSS SECTION A - A' | |

| DATE 11/96 | 0733.0010 | EXHIBIT 2.2-5 |
|---|---|---|

# CROSS SECTION
# D - D'



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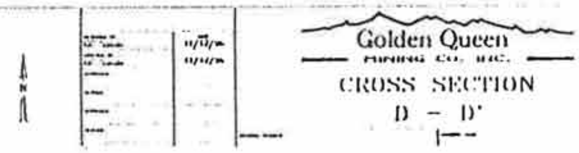



| | |
|---|---|
| WZI INC. BAKERSFIELD, CALIFORNIA | |
| GOLDEN QUEEN MINING COMPANY INC. **Soledad Mountain Project** | |
| CROSS SECTION D - D' | |

| DATE 11/96 | 0733.0010 | EXHIBIT 2.2-6 |
|---|---|---|

aggregate or construction materials, after obtaining necessary permits and licenses. Overburden materials mined from or piled on BLM lands may not be used for such purposes unless prior approval is obtained from the BLM.

During the development of the open pit mine, it is expected that higher grade vein mineralization will be exposed within the pit walls. Some of these structures may be amenable to mining by underground methods with access from the pit. In this case, additional mining of the resource by underground methods may be anticipated. Development of an underground mineral resource will result in the design, construction, and operation of processing and recovery facilities, appropriate for the quantity and quality of the underground ore. These facilities, which may include additional milling and leaching capacity, will be integrated with the existing process facilities.

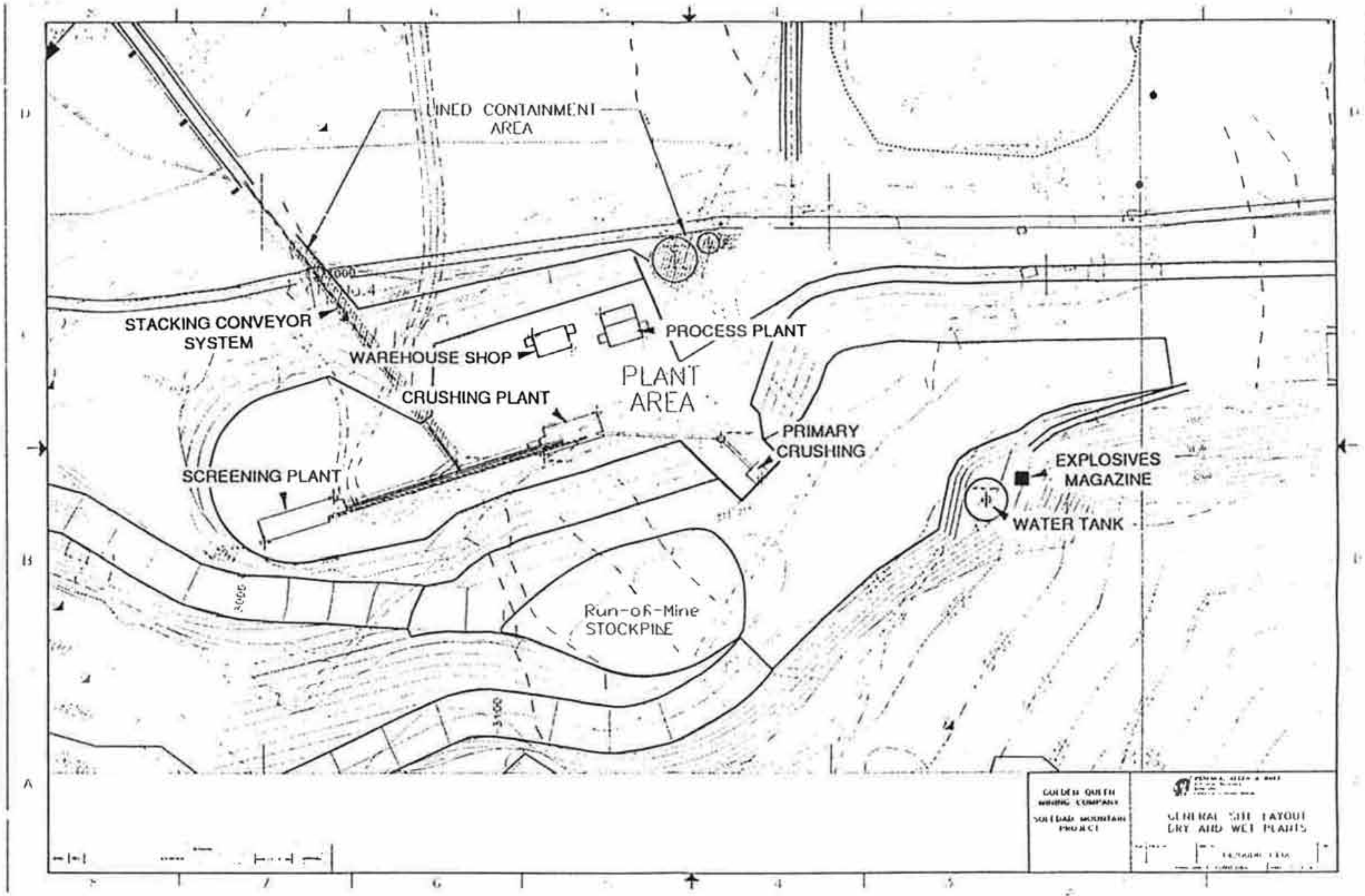
#### 2.2.2.2 Process

The ore processing facilities will be located directly south of Cell #2 of Leach Pad #1. Exhibit 2.2-7 presents the general arrangement of the facilities.

##### 2.2.2.2.1 Crushing and Agglomeration

Mining operations will haul and deposit ore at the jaw crusher dump pocket or at the ore stockpile, which will be located adjacent to the crushing facilities. This stockpile, which will contain up to 80,000 tons, provides for the continuous processing of ore independent of mining operations. It is expected that greater than 75% of the ore will be unloaded directly to the jaw crusher dump pocket.

The crushing facility will be a four stage process designed to reduce the run-of-mine ore to nominally minus 10 mesh (approximately 1/16$^{th}$ inch) particles. This process exposes precious metals mineralization at the surface of the particles and in newly created fractures so that efficient mineral recovery can be effected. The process proposed will be a conventional crushing and screening process utilizing proven, energy efficient processing equipment and procedures.




N

0 300' 600'

SCALE IN FEET

**WZI INC.**
BAKERSFIELD, CALIFORNIA

**GOLDEN QUEEN MINING COMPANY INC.**
**Soledad Mountain Project**

ORE PROCESSING AREA

| DATE 11/96 | 0733.0010 | EXHIBIT 2.2-7 |
|---|---|---|

Following crushing, the particles will be agglomerated using a binder, such as cement or lime, and barren process solution. This process forms relatively uniform particles with an approximate diameter of 1/8 to 3/8 inch. Agglomeration is also a conventional, proven process. It assures percolation of solutions within the heap for maximum precious metals recovery rate and efficiency, provides dust control during transfer and placement of ore to and on the heaps, and allows for timely and efficient neutralization and reclamation of the heap. Agglomeration also helps to assure that ponding of process solution, which may be attractive to wildlife, will not form on the heaps. Finally, the agglomeration binder provides protective alkalinity to the process solutions which is the chemical mechanism that maintains cyanide in liquid solution.

Incorporated into the design of the crushing facility will be the use of water sprays for dust suppression and three baghouses for dust collection. At the ore dump pocket, dust suppression will be accomplished by the use of water sprays. To effect dust collection, process equipment feed and transfer points are swept by the baghouse dust collectors. The conveyors are hooded to prevent wind from entraining dust. Dust collected from the baghouses will be returned into the process.

This facility, as well as the remainder of the downstream processing and project facilities, will be constructed under an Authority to Construct and operated under a Permit to Operate. Both of these documents are issued by the Kern County Air Pollution Control District after examination of the project and demonstration of its ability to meet air pollution control requirements. The agglomeration process does not require dust suppression or collection equipment because of the water added to and contained within the process.

This facility will process an average of 800 tons of ore per hour and operate 24 hours per day, 7 days per week, with 7 to 10 people assigned to each crew. This area will be the major power consumer for the project. The power supply for all equipment, except the wheel loader, will be commercial electric power.

Equipment maintenance will generally be done in place, with occasional component parts being repaired or refurbished at the maintenance shops or offsite at a contractor.

Exhibit 2.2-8 presents a generalized flowsheet for the crushing and agglomeration facilities. A listing of the crushing and agglomeration equipment is shown in Table 2.2-2.

**TABLE 2.2-2**

**CRUSHING AND AGGLOMERATION EQUIPMENT**

| ITEM | QUANTITY |
|---|---|
| Apron feeder | 1 |
| Vibrating grizzly feeder | 1 |
| Jaw crusher, 42" x 48" | 1 |
| Secondary 7' standard cone crushers | 2 |
| Tertiary 7' shorthead cone crushers | 2 |
| Quaternary vertical impact crushers | 6 |
| Vibrating double deck screens | 6 |
| Conveyor belts | 5 |
| Feeders | 16 |
| Agglomeration drum | 1 |
| Cement storage silo | 1 |

Ore will normally be fed to the system by direct dumping of haul trucks into a dump pocket built over the vibrating grizzly. Alternatively, wheel loaders will feed the system from an ore stockpile. Using the variable feed rate provided by the vibrating grizzly feeder, ore will be withdrawn from the ore dump pocket. Ore less than 5 inches in size will pass through the grizzly to a belt conveyor. The larger than 5 inch pieces of ore will be discharged from the grizzly into the jaw crusher, where they will be crushed to less than 5 inches in size. After passing under a magnet, where tramp metals will be removed from the process stream, ore will be weighed using a belt scale, and screened at the primary screen. From the primary screen, the oversize, pieces larger than 1-1/4 inches, will be fed to the standard cone crusher. Product from the standard cone crusher will return to the primary screen for removal of the newly crushed particles. The smaller than 1-1/4 inch ore will continue to the primary storage bin.

GENERALIZED CRUSHING and SCREENING FLOW DIAGRAM

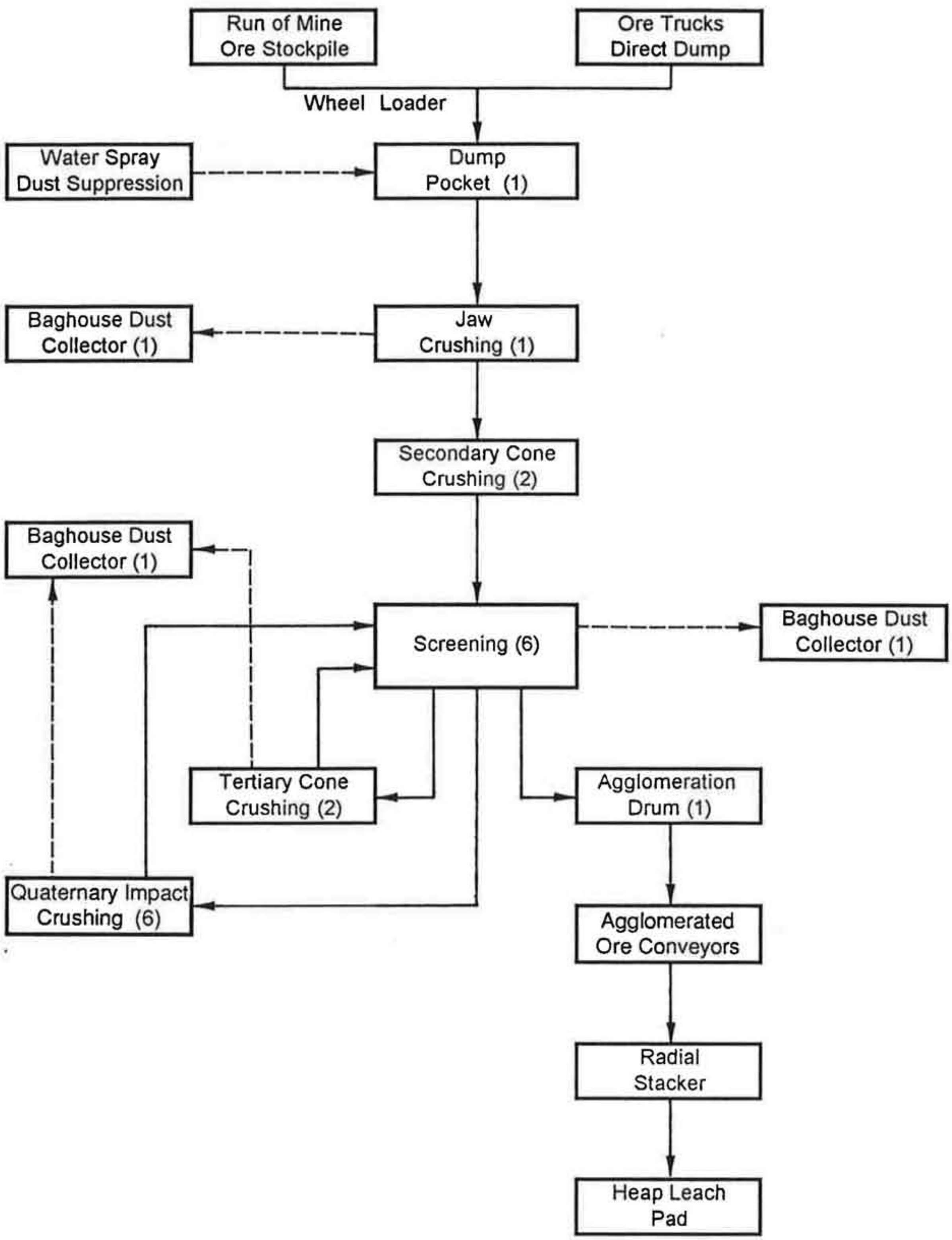



EXHIBIT 2.2-8
0733.0010

From the primary storage bin, ore will be withdrawn by feeders to the secondary screens. At the secondary screens the ore will be divided into three fractions: a smaller than 10 mesh (approximately 1/16$^{th}$ inch) product, which will meet the final product sizing criteria; a size fraction between 5/8 inches and 10 mesh, which will be fed through surge bins to the tertiary impact crushers; and a size fraction between 1-1/4 inches and 5/8 inches which will be fed through surge bins to the shorthead cone crushers. The entire crushing system will be in closed circuit, meaning that all final product will pass through the secondary screens prior to leaving the crushing and screening circuit for the secondary storage bin that feeds the agglomeration system.

Movement of the ore in process between the various crushers and screens will be accomplished using conventional covered belt conveyors. Following final sizing, the ore will be fed from the secondary storage bin to a conveyor belt, onto which cement, or other binders will be added in controlled amounts to the ore. The ore will be conveyed over a scale and through a sampling system to the agglomeration drum.

The agglomeration process consists of adding controlled amounts of barren process solution to the ore and feeding it into the drum, which rests horizontally and rotates on its long axis. The rotation of the drum induces the ore to roll within the drum. This, in combination with the solution and the binder, tends to adhere the fine particles together and coat the more coarse particles with fine particles so that 1/8 to 3/8 inch sized spherical particles emerge from the discharge end of the drum. As these agglomerated particles cure, that is, as the binder sets up, a porous particle with good integrity will be produced that provides structural stability to the heap, allows for good solution permeability within the heap, and provides for contact between the process solutions and the gold bearing surfaces of the particles.

Because barren process solution will be used in the agglomeration process, the agglomeration facilities and all downstream conveyor transportation equipment will be placed over a containment structure or liner. This containment, which will meet State Water Resources Control Board requirements, will prevent discharge to the environment of any solution bearing material.

#### 2.2.2.2.2 Conveying and Stacking

Agglomerated ore will be transported from the agglomeration drum to the heap leach pads utilizing a system of fixed and portable ("grasshopper") conveyors or, for leach pad number 2, may be loaded and hauled by truck. The conveying systems will be placed upon separate containment structures between the agglomeration area and the heap leach pads. Ore conveyed across the leach pads will be located above the leach pad containment system. At appropriate points, ore will be transferred from the main transport conveyor(s) to grasshopper conveyors that cross the heap leach pad and discharge to a radial stacker. The radial stacker will provide final placement of ore on the heap.

Placement of the agglomerated ore in this manner will reduce the need for the use of heavy mobile equipment on the heap and allow for improved structural integrity of the agglomerates. It also reduces the potential for natural segregation of particles by size, improving permeability of the heap and percolation rates.

Dust collection and suppression will not be required in this system due to the agglomeration of fines and the moisture content of the material.

Ore will be stacked in horizontal lifts from 30 to 35 feet in height up to a final height of 180 feet. The downslope portion of the heap will be constructed at 2.5:1.0 (horizontal to vertical) and the perimeter slopes will be constructed at a slope of 2.0:1.0 (horizontal to vertical). Geotechnical analyses of the heap have shown this configuration to be stable under static and earthquake induced loads and to be consistent with the operating goals of the project.

Equipment maintenance will generally be done in place, with occasional component parts being repaired or refurbished at the maintenance shop.

### 2.2.2.2.3 Leach Pads and Leaching

Two heap leach pads are proposed for construction at the site. The planned locations for both are shown in Exhibit 2.2-1 . Pad 1, located to the north of the mining area, will be the first to be constructed. Pad 2, located to the west of the mine, will be built as Pad 1 reaches capacity.

Both pads will be constructed sequentially as required to meet mining and processing demands. Both heap leach pads will be designed and constructed in conformance with requirements of the Lahontan Regional Board. For general reference to the design concept of the proposed pads, the term modified valley-fill heap leach can be used to describe them as dedicated heap leach pads with internal solution control.

Each pad will consist of cells which will have internal dividers or berms to control solution flows and solution storage. The perimeter dikes, berms and internal dividers will be constructed of overburden material from the open pit mine and/or surplus alluvial materials generated from grading the heap leach pad sites.

The heap leach pads will be designed as side hill leach pads with perimeter dikes supporting the toe of the heaps. The dikes will also provide solution storage capacity, eliminating the need for conventional process surge ponds. Berms will be constructed around those portions of the heap leach pads not enclosed by the perimeter dikes.

This design was selected for several reasons. One of the most important attributes of the valley fill concept is the lack of solution ponds exterior to the leach pads. The toe dike creates a pond area for in-heap management of the solutions, runoff from precipitation, and retention of the design storm event. Also, the lack of barren and pregnant solution ponds minimizes evaporation of water and hazards to wildlife.

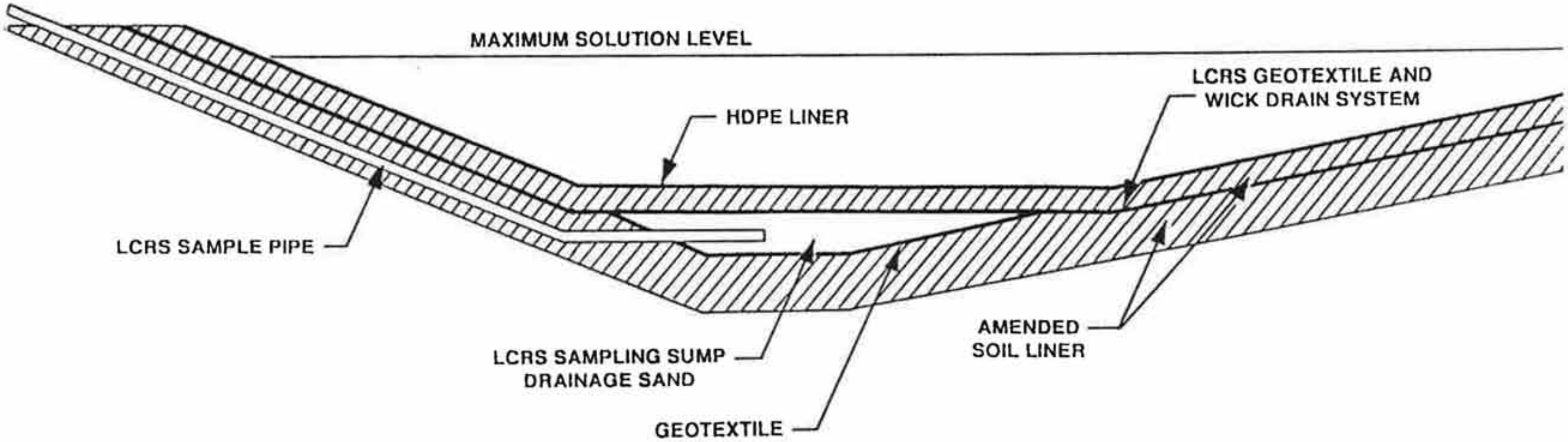
The topography is relatively steep with respect to heap stability on a synthetic liner. The toe dike supporting the heap enables the heap to be constructed over the natural topography rather than having extensive earthwork to reduce the pad grade for a stable, unsupported heap.

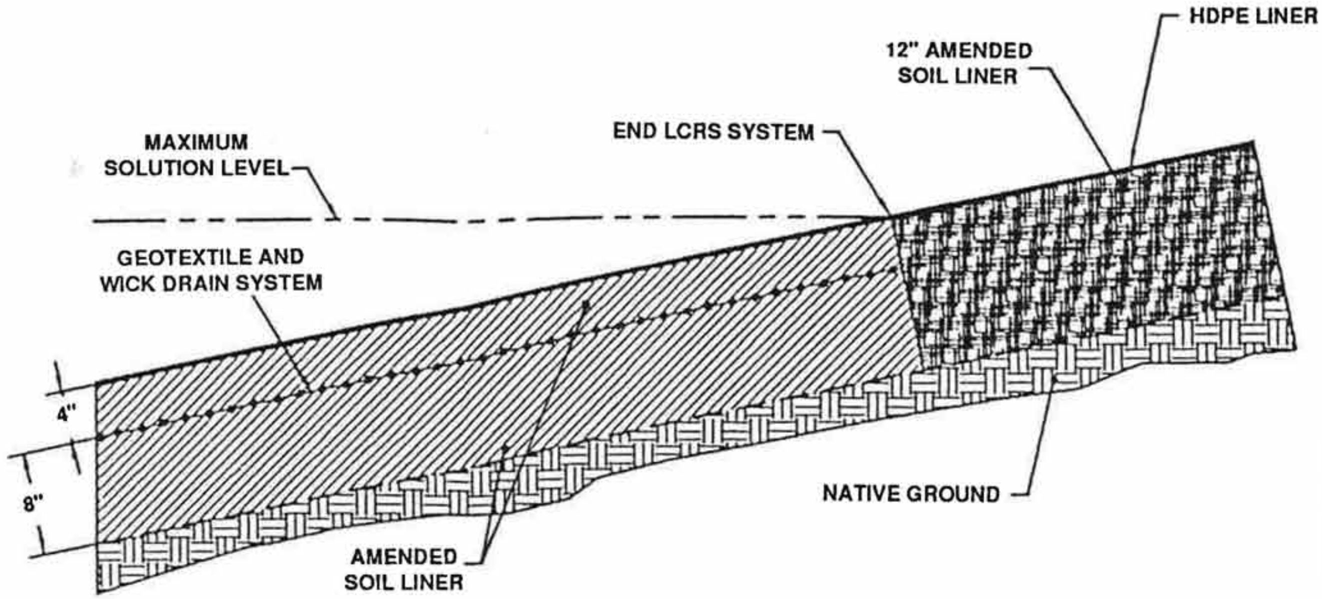
The impoundment portion of the pads will be designed to allow for a 100-year, 24-hour storm event and to be no more than 25 feet in height. The crest of the dike will serve as an access road. The pad area will be divided into cells by internal berms which will be located such that the storage capacity of the individual cells will be less than 50 acre-feet prior to the stacking of ore. Based upon this criteria, the dike will not be subject to the jurisdiction of the State of California Department of Water Resources, Division of Safety of Dams (DSDD).

The pad liner system will be constructed as a two stage composite liner with two distinct sections. The downslope portions of each heap leach pad cell will contain standing process solutions and will be lined with a 60 mil High Density Polyethylene (HDPE) top liner and bottom liner consisting of 12 inches of bentonite amended soils installed with a permeability of less than $10^{-6}$ cm/sec. The existing tailings piles will be the source of some of the soil for the bottom liner. Installed within the amended soil layer will be a leachate collection and recovery system (LCRS). The LCRS will consist of a continuous layer of geotextile connected to a geotextile wick drain system that will direct any intercepted liquid to a sampling sump located at the lowest portion of the leach pad cell (Exhibit 2.2-9).

The LCRS serves two purposes: 1) it provides a detection method in the event there is a leak in the upper liner and 2) it removes any liquid which may pass through the upper liner to prevent the liquid from potentially passing through the lower liner. Any liquid which collects in the LCRS is collected and analyzed to determine if it contains liquid from the heap leach pad.

The portions of each cell up-slope from the solution storage area, which will not contain standing fluid, will be lined with a composite 60 mil HDPE top liner located directly on top of the 12 inch thick amended soil base, also installed using bentonite amendment to a permeability of less than $10^{-6}$ cm/sec.




TYPICAL LINER SYSTEM TRANSITION DETAIL

WZI INC.
BAKERSFIELD, CALIFORNIA

GOLDEN QUEEN MINING COMPANY INC.
Soledad Mountain Project

HEAP LEACH PAD LINER AND
LCRS SCHEMATIC

| DATE 11/96 | 0733.0010 | EXHIBIT 2.2-9 |
|---|---|---|

This liner system will be in compliance with design requirements for a Group B waste under Title 23 CCR, Chapter 15 guidelines. Based on test data, the ore placed on the pads will be classified as a Group B waste during the operations phase of the project and declassified at closure.

The synthetic pad liners will be installed by experienced contractors with quality assurance being provided by an independent engineering firm. Seams and joints will be inspected and tested during construction to ensure liner integrity. Prior to release for operation, the liner will undergo a final inspection and any imperfections corrected. Similarly, base materials and the clay portion of the composite liner will be constructed and inspected according to engineered specifications.

Existing tailings will be used in the construction of the amended solid portion of the composite liner and for other liner base and bedding materials, to the maximum extent feasible.

Vadose zone monitoring will be done using lysimeters. The lysimeters will be placed under the fluid storage portion of the cells to detect any potential leakage through the liner system. They will be placed directly beneath the liner deep enough to exclude condensation or moisture resulting from the weight of ore being stacked on the leach pads.

Lysimeters are designed to allow the collection of liquids which occur within the unsaturated zone between the liner and groundwater. If the lysimeters collect a sample, it will be analyzed to determine if any solution is being released from the leach pad and appropriate action will be taken.

Initially, three groundwater monitoring wells will be located near the dike outside of leach pad number 1, cells 1 and 2. The monitoring wells, which will be installed with approval from the Lahontan Regional Board, will provide for statistical sampling comparisons of groundwater for any constituents of concern. One of the wells will be "up-gradient" from the leach pads, providing for sampling of water that cannot be affected by the mining operation. The remainder of the wells will be "down-gradient", allowing for monitoring

for any potential releases. Regionally, "up-gradient" is northwest of Soledad Mountain. Monitoring wells for leach pad 1 will be added as the heap leach cells are extended to the east. Leach pad number 2 will be designed and constructed with similar monitoring systems.

Precious metals will be leached from the ore using an alkaline, 10.5 pH or greater, dilute cyanide solution (containing up to 300 ppm of cyanide). This solution will be applied on a controlled basis using drip irrigation methods (emitters) at a rate of up to 5,400 gallons per minute. As the solution percolates through the heap, it contacts the precious metals and dissolves them. The enriched solution (pregnant solution) is intercepted at the top liner by a network of solution collection pipes. These pipes carry the solution to the solution storage portion of each pad cell, where it will be stored for either recirculation to the heap or pumping to the process plant for recovery of the contained metals. The piping system also reduces the static solution head on the composite liner, reducing the potential for significant leakage and improving the rate of process solution recovery.

All pregnant solution on the pads will be contained inside the heap. Pregnant solution will be extracted for processing and recovery of metals from process solutions by pumps placed in pipes laid down on the inside slope of the dike. This prevents liner penetration and associated leakage potential. Booster pumps will move the solution to tankage at the process plant. No open ponds will be required with this arrangement.

Within the leaching process, sodium cyanide will be lost through chemical complexing with minerals within the ore and through natural degradation due to exposure to oxygen and sunlight. Following processing of the pregnant solution for the recovery of precious metals, concentrated sodium cyanide solution will be added, as required, to the barren solution to maintain the design leaching solution strength.

Sodium cyanide will be received in either solid or liquid form in tank trucks. If received in solid form, a caustic solution will be circulated through the tank to dissolve the sodium cyanide. The concentrated solution will be stored in a tank, from which it will be added to the barren solution using pumps. If liquid cyanide solution is received, the solution will be transferred directly to the sodium cyanide storage tank upon receipt. In either

case the delivery truck, the storage tank, and the transfer system will be located on a spill containment system.

Although there will be no discharge from the process, water will be held within the heap as residual moisture and will be lost from the processing solutions through evaporation. It will be necessary to continually add fresh water to the process solutions, usually into the barren solution, to make up for that which will be lost.

Access to the heap leach pads by wildlife or trespassers will be restricted by the construction of a fence around the perimeter of the leach pad sites, the design of which will exclude people and wildlife.

#### 2.2.2.2.4 Solution Processing

The precious metals recovery process plant and its associated reagent storage area will be located up-slope from heap leach pad number 1 and will be constructed over a designed and permitted containment system. This system will allow the recovery of any spill and its return into the gold recovery process at the appropriate point in the process.

Two precious metals recovery processes may be used at the project. The Merrill-Crowe zinc precipitation process will be used throughout the majority of the operating period and early into the reclamation portion of the project. For the completion of heap neutralization and reclamation, a carbon adsorption process may be required. If the change is necessary it will occur when the tenor of the pregnant solution becomes low in gold content, making the Merrill-Crowe process inefficient. Also, the carbon adsorption process will assist in the removal of other metals, such as copper, which may be found in the process solutions during neutralization. Since neutralization of the heaps will proceed on a phased plan, the two processes would operate in parallel for a portion of the life of the project.

Both precious metals recovery methods process pregnant solution for the recovery of gold and silver leached from the ore. Both will be closed circuit processes which

recirculate all solutions. The only water lost in these processes will be through evaporation and that which will be tied up as moisture within the ore.

The Merrill-Crowe zinc precipitation process is a common, widely used process for gold and silver recovery. This process is based upon the ability of gold and silver in solution to replace metallic zinc in a solid form, releasing metallic zinc to the pregnant solution. Exposure of solutions containing gold and silver to zinc powder result in the gold and silver precipitation. The zinc goes into solution and the gold and silver precipitate in a metallic form. The resultant sludge, containing the gold and silver, is smelted with common fluxes to produce doré, a metallic mixture of gold and silver.

The generalized precipitation reaction is written as:

$$2Au\ (CN^{-})_2 + Zn = 2Au + Zn\ (CN\ )_4$$

In a carbon adsorption process, the pregnant solution is introduced to a series of tanks in which activated carbon is held. As the pregnant solution flows through the carbon, gold, silver, and other metals such as copper and zinc, are adsorbed from solution and held by the carbon. When the carbon reaches its precious metals holding capacity, it is transferred from its column to a stripping vessel.

In the stripping cycle, a hot caustic soda and sodium cyanide solution is circulated at a low flow rate through the carbon, resulting in the precious metals being released from the carbon to the caustic solution. This solution is passed through an electrowinning cell where the precious metals are recovered electrolytically from solution to cathodes. The cathodes are processed to produce a gold-silver sludge, which is then smelted in a manner similar to that used by the Merrill-Crowe process.

Exhibit 2.2-10 presents a process flow diagram showing both processes and how one may replace the other. Table 2.2-3 presents a listing of the major process equipment components used in the process.

GENERALIZED PROCESS PLANT FLOW DIAGRAM

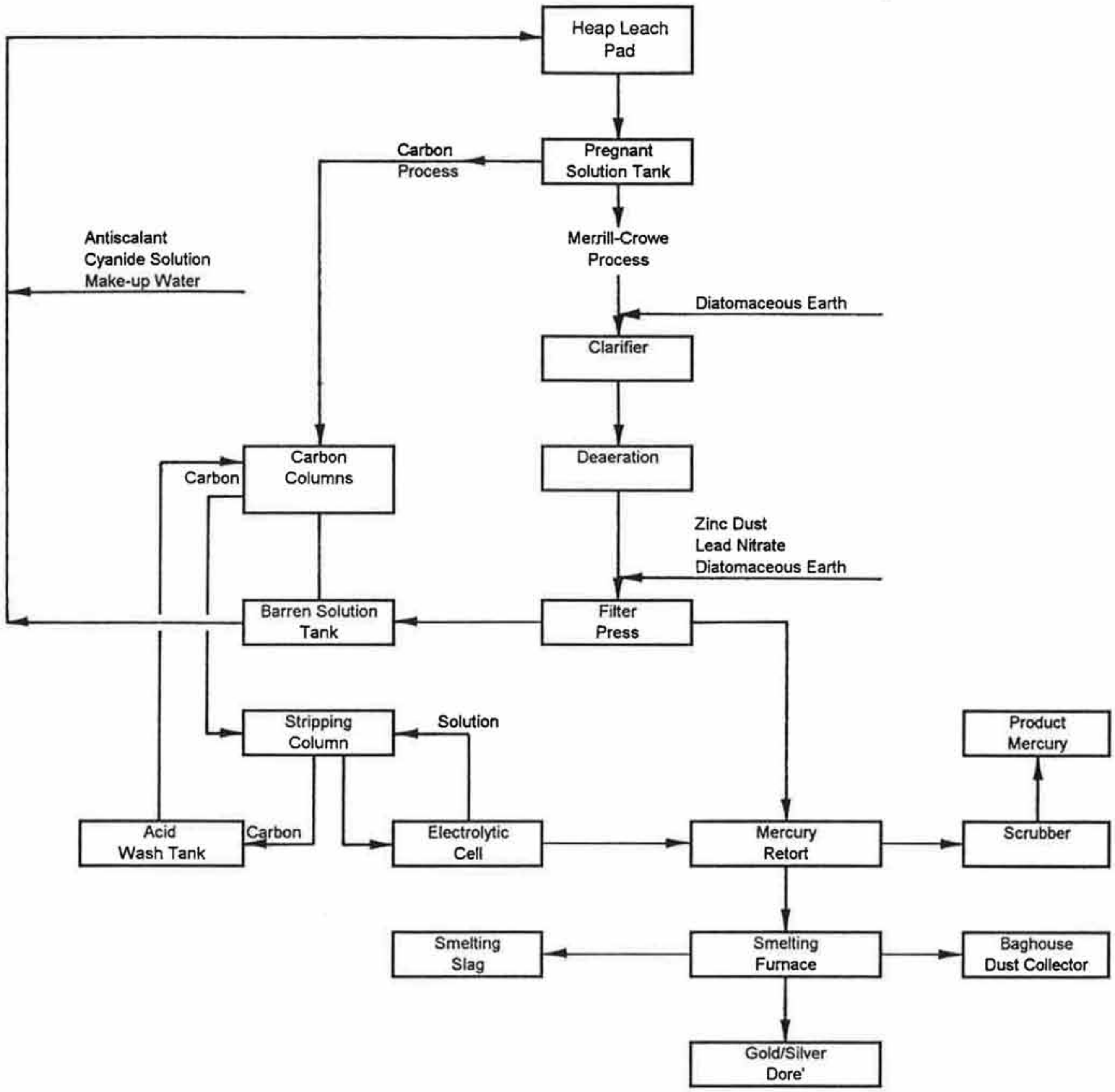



**EXHIBIT 2.2-10**
0733.0010

The feed solution to either process will be the pregnant solution stored within each cell of the heap leach pads. This solution will be pumped from the cells to the plant through the use of submersible pumps located inside pipes which run from the top of each cell embankment into the solution holding portion of the cell. The submersible pumps deliver the solution to a booster pump and piping system, which transports the solution to the process plant by way of the pregnant solution holding tank.

Barren solution, that solution from which the precious metals have been recovered, flows directly to barren solution surge tanks for recirculation back to the heap leach pads.

The solution transfer systems are designed as double lined systems for protection of the environment. Solutions will be contained within pipes or process vessels, all of which rest upon lined surfaces or within containment structures.

**TABLE 2.2-3**

**Process Plant Equipment List**

| **ITEM** | QUANTITY |
|---|---|
| **Merrill-Crowe Processing** | |
| Pregnant Solution Tank Pump | 1 |
| Solution Clarifier | 2 |
| Deaeration Column | 1 |
| Filter Press | 2 |
| Mercury Retort and Scrubber | 1 |
| Smelting Furnace | 1 |
| Barren Solution Tank and Pump | 1 |
| **Carbon Adsorption Processing** | |
| Carbon Adsorption Columns | 5 |
| Carbon Stripping Column | 1 |
| Acid Wash Tank | 1 |
| Electrolytic Cell | 1 |

Based upon ore samples, mercury concentrations averaging less than 1 ppm are expected in the ore grade material. Mercury removal capability will be provided as a contingency based upon experience at other local mining operations. Any mercury present will be removed from the precious metals concentrate using a mercury retort. The mercury retort removes mercury from ore concentrate by electrically heating the concentrate and, by means of a vacuum, drawing the mercury vapor through a water-cooled condenser where the vapors will be collected as a liquid. The recovered mercury will then be sold to the commercial market. Off gases from the condenser will be scrubbed using activated carbon. No other mineral, metal or organic vapors are expected to result from the retort process.

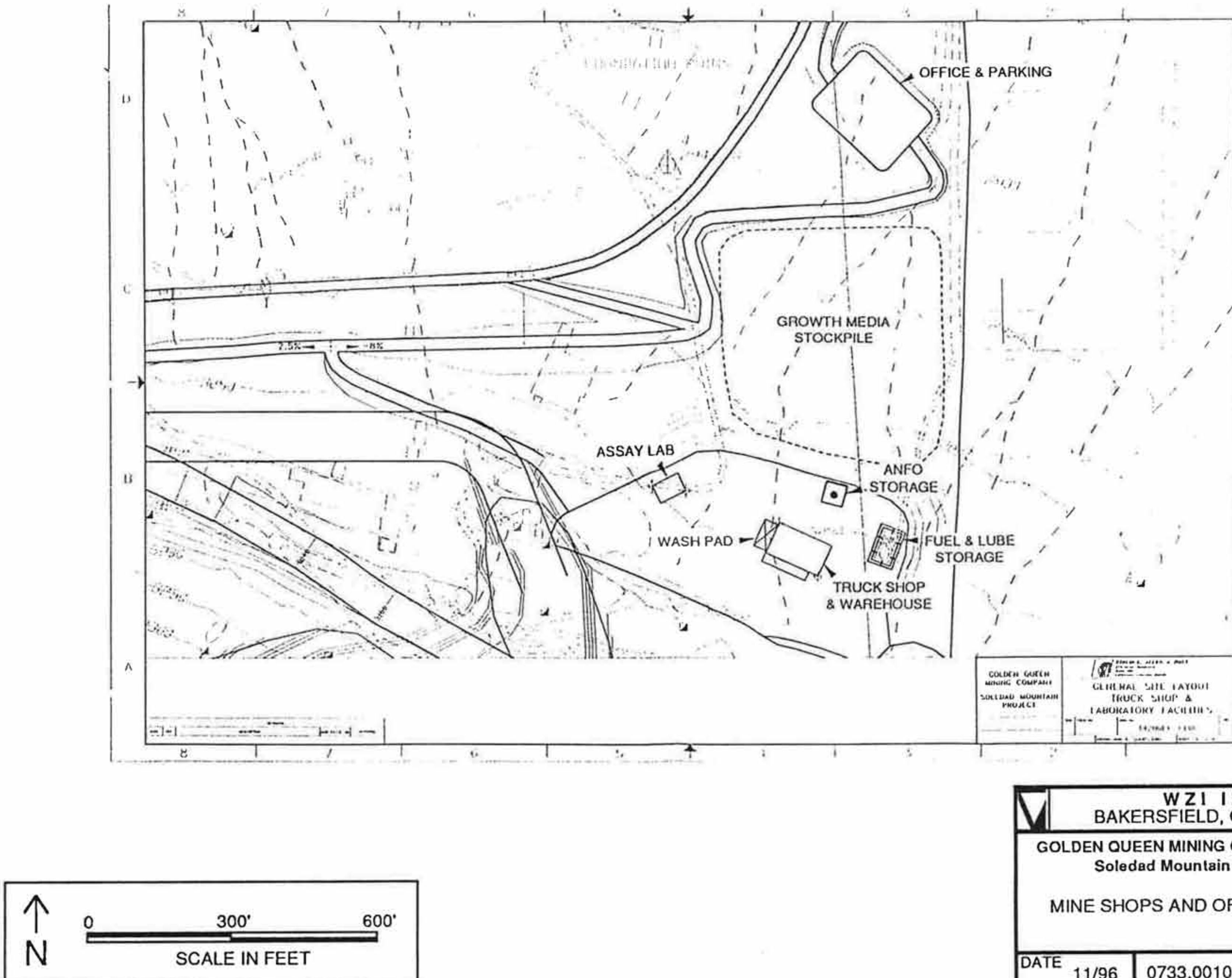
#### 2.2.2.3 Building Structures

Two combination maintenance shops/warehouses will be constructed in which repair and maintenance of project equipment will be done. One will serve the mining and mobile equipment for the project; the other will serve the crushing, agglomeration and process plant needs. Each shop will be located as shown in Exhibits 2.2-7 and 2.2-11.

##### 2.2.2.3.1 Truck Shop/Warehouse

The truck shop/warehouse facility will consist of a 100' x 70' steel building with a concrete floor and a concrete apron at the front of the building (Exhibit 2.2-11). It will contain two "high bays" (designed with door openings and a roof height such that a mine haul truck could enter the building and raise its bed), two "low bays" (which will essentially be a typical garage sized bay for the repair of smaller equipment and vehicles), and a repair parts storage area. Outdoor work will be done on equipment parked on the apron.

The warehousing portion of the mine maintenance facility will provide for the receipt, storage, and disbursement of operating and maintenance supplies and for outside storage of bulk fuels, lubricants, and replacement parts. Used materials planned for rebuild, reuse, or disposal will also be stored at this facility, both inside the building and in the outdoor storage area.




WZI INC.
BAKERSFIELD, CALIFORNIA

GOLDEN QUEEN MINING COMPANY INC.
Soledad Mountain Project

MINE SHOPS AND OFFICE AREA

| DATE 11/96 | 0733.0010 | EXHIBIT 2.2-11 |
|---|---|---|

This facility, which will include offices, lockers, and sanitary facilities, will be designed and constructed to meet the Uniform Building Codes and the fire and safety requirements of Kern County.

Fuels and lubricants will be stored in approved tanks, above ground, within containment structures designed to contain the quantity of materials stored with adequate freeboard.

Provision will be made for the collection and disposal of used lubricants and filters. All hazardous materials will be received, stored, dispensed, and recovered in compliance with applicable rules, regulations, and company policies.

Blasting agents and explosives received by the warehouse will be placed in separate storage facilities and magazines located as shown in Exhibit 2.2-7 and 2.2-11. These facilities will be designed, permitted, and maintained according to the rules, regulations and standards of the California Occupational Health and Safety Administration (Cal OSHA), the Federal Mine Safety and Health Administration (MSHA), the Bureau of Alcohol, Tobacco, and Firearms (ATF), and according to Golden Queen company policy.

Associated with this shop will be an equipment washdown facility. This facility, the general location of which is shown in Exhibit 2.2-11, will be used to wash accumulated soils and grime from equipment as part of the equipment maintenance procedure. High pressure water, combined with a bio-degradable detergent, will be used for this service. Also included in this facility will be steam cleaning capability provided by an onsite steam generator and application system.

Water for this operation will be recovered and recycled using a containment system designed to meet all regulatory standards. Oil or grease will be recovered and disposed of according to the applicable regulations. Soils recovered will be placed on a containment structure (e. g. the heap leach pile or the washdown pad), allowed to drain, and transported to an overburden pile.

#### 2.2.2.3.2 Process Shop/Warehouse

The process shop/warehouse facility will consist of a 60' x 40' steel building with a concrete floor and a concrete apron at the front of the building (Exhibit 2.2-7). It will contain equipment repair areas and a repair parts storage area. Outdoor work will be done on the apron.

The warehousing portion of the process shop/warehouse will provide for the receipt, storage, and disbursement of operating and maintenance supplies and for outside storage of bulk fuels, lubricants, reagents, chemicals, and replacement parts. Used materials planned for rebuild, reuse, or disposal will also be stored at this facility, both inside the building and in the outdoor storage area. Some supplies, such as process reagents, small parts, and lubricants, will be stored at the location where their use will take place.

This facility, which will include offices, lockers, and sanitary facilities, will be designed and constructed to meet the Uniform Building Codes and the fire and safety requirements of Kern County.

Provision will be made for the collection and disposal of used lubricants and filters. All hazardous materials will be received, stored, dispensed, and recovered in compliance with applicable rules, regulations, and company policies.

#### 2.2.2.3.3 Analytical Laboratory

The analytical laboratory will provide a facility for the analytical and metallurgical testing needs of the project. The laboratory will be housed within an existing project site building or within a new 60' x 40' steel building. In either case the laboratory building will contain offices, laboratories, and storage, locker, and sanitary facility space. It will be designed and constructed to meet the Uniform Building Codes and the fire and safety requirements of Kern County. Exhibit 2.2-11 presents the tentative location of these facilities. Activities within the lab will include sample reduction and preparation, fire assaying of mine samples, digestion of solid samples for analysis by chemical and

atomic absorption techniques, analysis of solution samples by chemical and atomic absorption techniques, and metallurgical process testing of mine materials and process technology.

Most process related products used in the laboratory, such as ore and waste residue and process solutions, will be neutralized and placed upon the heap leach piles or returned to the appropriate metallurgical process streams. Where necessary, hazardous materials will be accumulated and transported to licensed offsite waste disposal facilities.

Emissions control equipment will be provided as required by and in accordance with permit provisions issued by the Kern County Air Pollution Control District.

##### 2.2.2.3.4 General Offices

Initially, existing site buildings will be used for the project offices. These buildings will eventually be removed from the site as the project proceeds. At that point, a new office building will be constructed near the new entrance to the project. Exhibit 2.2-11 presents the location of these facilities.

The new office will house offices for management, operations and engineering, meeting rooms, and sanitary facilities. It will be designed and constructed to meet the Uniform Building Codes and the fire and safety requirements of Kern County. Included will be an adjacent parking lot for employees and visitors.

### 2.2.3 Ancillary and Public Service Facilities

The proposed project will require auxiliary services to support operations of the mine. These services include electrical power, process water, chemical storage, sewage treatment, trash disposal, roads, and hazardous material storage. Each of these ancillary services is discussed more fully in the following sections.

### 2.2.3.1 Electrical Power

The mining operations will use publicly available electrical power. An existing Southern California Edison Company 64 KV line runs adjacent to the proposed project and will feed the project substation (shown on Exhibit 2.2-1) from which power will be distributed to operating facilities. Both overhead and underground power distribution will be used. For backup power, in case of a commercial power outage, diesel powered electric generators will be maintained, primarily to provide power to the heap leach pumping operations.

### 2.2.3.2 Water

Two sources of water will be used. Bottled water will be supplied for drinking. Well water will be used for all other operating needs.

The project will require water for makeup to heap leach solutions (to compensate for that lost through evaporation and as residual moisture) and for dust control in the mining and crushing/conveying operations. Water will be obtained from three groundwater supply wells planned to be installed in Section 31, Township 11 North, Range 12 West, SBBM, north of Silver Queen Road. From the wells, water will be pumped under Silver Queen Road to the project site. Water requirements for the project are estimated to average 750 gallons per minute.

### 2.2.3.3 Chemical Storage

Chemicals will be stored in closed, appropriately designed, weather-proof containers in secured, open air or well ventilated storage areas. All containers will be properly labeled and stored in conformance with state and federal regulations, the Spill Prevention Control and Countermeasure Plan, and Golden Queen safety policy. Where appropriate, containment structures will be constructed and used in the storage of liquids.

The storage of hazardous chemicals will comply with the spill control and secondary containment provisions found in Section 8003.1.7 of the 1994 Uniform Fire Code. The general requirements for spill control are a minimum of 4 inches of raised sill or recessed floor. The general requirement for secondary containment in areas exposed to rainfall is a system designed to hold the contents of the largest container plus the volume of a 24-hour rainfall as determined by a 25-year storm.

Employees will be trained in proper handling, storage and use of all reagents and chemicals. Trained employees will be the only people with direct access to reagents and chemicals.

Sodium cyanide may be received in solid form (briquettes) or as a 30% liquid solution. Sodium cyanide delivery truck drivers will be employees of the vendor or manufacturer and will be trained for the safe handling of both solid and liquid shipments.

If sodium cyanide is received in solid form it will be received in truckload quantities contained within a sealed tanker truck, or in sealed 3,000 pound tote bins. The reagent will be off-loaded from a tanker truck by circulating a caustic soda and water solution through the truck tank and into a solution storage vessel until all the solid sodium cyanide is dissolved and removed from the tanker.

Tote bins will be received on a flat bed truck. They will be removed from the truck using a forklift and stored in the reagent storage area. Cyanide solution is made from the tote bins by emptying the tote bins into an agitated mixing tank containing alkaline water solution. The mixed solution will then be transferred to the solution storage vessel for use.

If received in liquid form, the sodium cyanide will be off loaded from the truck by pumping the solution from the tanker into the solution storage vessel. All additions of sodium cyanide to the process solutions will be made using the stored solution. No other sodium cyanide will be kept onsite except for small quantities needed by the laboratory for analytical purposes.

Other fuels, reagents or chemicals will be received in bulk (primarily fuels and lubricants) or in steel or plastic drums. The bulk materials will be transferred to storage vessels in a manner usual and appropriate to the nature of the material. Other materials will be stored in their shipping containers, over containment structures, as appropriate. Table 2.2-4 in Section 2.2.3.7 presents a listing of the hazardous materials that will be stored and the amounts that will be expected to be onsite.

#### 2.2.3.4 Sewage Treatment

The construction workforce required will be approximately 250 people. A permanent workforce of about 230 employees, distributed among crews working 24 hours per day, 7 days per week, will be expected during operation. Permitted sewage (septic system) facilities will be provided in a number of operational areas, including the general office, the maintenance shops/warehouses, the laboratory and the process plant. People in areas not directly served by these facilities will have access to portable toilets placed conveniently to their work sites. Permits for the septic systems will be obtained from the Kern County Environmental Health Services Department.

#### 2.2.3.5 Trash Disposal

The existing Gold Fields mill and other miscellaneous structures in the number 1 heap leach pad area will be demolished during the construction effort. All debris will be disposed of in accordance with applicable local, state, and federal laws and regulations.

Non-mining waste, such as office and lunchroom waste, will be removed from the site by a contract hauler for disposal in an approved landfill. The quantity of this waste will be expected to be 10 to 12 cubic yards per week (6 to 8 tons per month).

Regulated wastes such as used oil, spent solvents and laboratory wastes will be manifested and transported from the site by authorized haulers. All wastes will either be recycled or disposed of in accordance with applicable local, state, and federal laws and regulations.

#### 2.2.3.6 Roads

Exhibit 2.1-3 shows the location of area roads and those which will be used for access to the project site. Access is via Mojave-Tropico/Silver Queen Road, an existing paved road. Mojave-Tropico Road runs north/south on the west side of the project. Mojave-Tropico Road turns east just north of the project and the name changes to Silver Queen Road. Silver Queen Road intersects State Route 14 approximately 2 miles east of the project site. State Route 14 is the major highway connecting Mojave, Rosamond, Lancaster and the Los Angeles area. The 1995 level of traffic on State Route 14 at the Silver Queen Road interchange was approximately 15,000 average daily trips (ADT). The 1995 Annual Traffic Census prepared by Kern County states that the ADT on Silver Queen Road is 410.

The entrance road to the project site will be south from Silver Queen Road directly opposite the intersection of Silver Queen Road and Gold Town Road. The entrance to the site, off Silver Queen Road, will be paved within the right-of-way of Silver Queen Road pursuant to an Encroachment Permit issued by the County of Kern. The remainder of the entrance road, parking and maneuvering areas will be surfaced with rock aggregate to minimize fugitive dust.

Silver Queen Road is a county road and is constructed to accommodate trucks as well as automobiles. Silver Queen Road is maintained by Kern County. The project is not expected to result in a pivotal increase in the amount of truck traffic, but may result in the need for a slight increase in road maintenance on Silver Queen Road. However, any increase in maintenance costs is expected to be mitigated by increased taxes such as fuel tax and property tax. An analysis of fiscal impacts associated with this project is contained in the socioeconomic analysis, Section 3.13 of this document. The analysis indicates that the project is expected to generate a positive cash flow to Kern County by providing taxes in excess of costs that will be incurred for County services.

Haul roads will be constructed on the project site to move the ore and overburden. Water trucks and/or approved chemical treatments will be used on the haul roads to control fugitive dust. Ore will not be transported on public roads. Overburden will not

be transported on public roads unless it has been sold as aggregate or construction materials. Transport of overburden materials for sale may add up to 140 ADT's to traffic on State Route 14 and Silver Queen Road.

New Eagle Road, a county road, currently extends into the project area in the northwest ¼ of Section 6, Township 10 North, Range 12 West, SBBM. New Eagle Road was created as a public road by order of the Board of Supervisors of Kern County in 1937 and was recorded in Minute Book 39, Page 487 of the Board of Supervisors. New Eagle Road intersects Silver Queen Road in the south ½ of Section 31, Township 11 North, Range 12 West, SBBM and travels in a southerly direction approximately 0.41 miles to the base of Soledad Mountain in Section 6, Township 10 North, Range 12 West, SBBM where it terminates and does not connect to any existing roads. It cannot be used by the general public to travel past its terminus in Section 6. The Soledad Mountain project includes vacating that portion of New Eagle Road within Section 6, Township 10 North, Range 12 West, SBBM. Silver Queen Road and New Eagle Road are clearly visible in the lower left portion of the oblique aerial photograph (Exhibit 2.2-2).

#### 2.2.3.7 Hazardous Materials

The project requires the use of materials which are classified as hazardous. A Hazardous Material Business Plan will be prepared and filed with the Kern County Fire Department. The Hazardous Material Business Plan will contain an inventory of all hazardous materials that exceed the threshold limits of 500 pounds of a solid, 55 gallons of a liquid, or 200 cubic feet of a compressed gas, as well as a list of the quantity and storage location of the hazardous materials. All materials will be handled, stored and used in conformance with local, state and federal regulations and company safety policy. Where appropriate, Proposition 65 notices will be posted.

The storage of hazardous materials will comply with the requirements of the 1994 Uniform Fire Code including the requirements for spill control and secondary containment found in Section 80.301. In addition, the storage of oil and petroleum products will comply with the requirements of the California Aboveground Petroleum Storage Act and the requirements of a Spill Prevention Control and Countermeasure Plan found in 40

CFR, 112. The California Aboveground Petroleum Storage Act requires the preparation of a Spill Prevention Control and Countermeasure Plan for facilities that have the storage capacity of 10,000 gallons or more of petroleum. The requirements found in 40 CFR, 112 include the preparation of a Spill Prevention Control and Countermeasure Plan for facilities that store more than 1,320 gallons or have a single container in excess of 660 gallons located in areas that could spill to navigable water of the United States. Spill Prevention Control and Countermeasure Plans require secondary containment systems sufficient to hold the contents of the largest tank plus sufficient freeboard for precipitation.

The hazardous materials expected to be used on-site and the anticipated maximum daily inventory is shown in Table 2.2-4.

#### 2.2.3.8 Buildings

Project related buildings, including offices, shops, warehouses, laboratory, storage, and process buildings, will be designed and constructed in accordance with Uniform Building Codes and other state and local building regulations. Required building and occupancy permits will be obtained. Buildings will be furnished, where appropriate, with water, electricity, heat, air conditioning, and sanitary facilities. Vehicle parking lots will be located near to or adjacent to most buildings.

#### 2.2.3.9 Communications

Commercial telephone service is available onsite and will be extended to numerous facilities within the project. Areas which will have telephone service will include: the general offices, the laboratory, the maintenance shops/warehouses, the process plant, and the crusher control room.

Mobile FM band radio, licensed by the FCC, will provide for local two-way radio communications between people, equipment, and areas without ready access to telephone service. A solar powered radio repeater will be located at an appropriate site within the project boundary to assure radio signal coverage.

TABLE 2.2-4

## LIST OF HAZARDOUS MATERIALS

| HAZARDOUS MATERIAL | ESTIMATED MAXIMUM DAILY INVENTORY |
|---|---|
| Sodium Cyanide, 30% solution | 40,000 gallons |
| Sodium Hydroxide, 25% solution | 10,000 gallons |
| Sulfuric Acid | 220 gallons |
| Nitric Acid | 220 gallons |
| Calcium Hypochlorite | 2,000 pounds |
| Lead Nitrate | 4 tons |
| Mercury (approximately 1 year production) | 1,000 pounds |
| Zinc Metal | 6 tons |
| Propane | 10,000 gallons |
| Diesel Fuel | 40,000 gallons |
| Unleaded Gasoline | 6,000 gallons |
| Refined Motor Oil, Gear Oil, Transmission Fluid, Etc. | 23,000 gallons |
| Solvents | 5,000 gallons |
| Greases | 3 tons |
| Acetylene | 15 - 390 $ft^3$ cylinders |
| Oxygen | 30 - 249 $ft^3$ bottles |
| Calcium Oxide (Lime) | 10 tons |
| Borax | 1 ton |
| Fluorspar (fluorite) | 500 pounds |
| Activated Carbon | 10 tons |
| Anti-Scalants | 5,000 gallons |
| Ammonium Nitrate | 80 tons |
| Blasting Emulsion | 2 tons |
| Cast Boosters | 4,000 each |
| Detonation Cord | 80,000 feet |
| Silica Sand | 1,000 pounds |
| Portland II Cement | 60 tons |
| Diatomaceous Earth | 5 tons |

### 2.2.4 Environmental Monitoring and Protection

Measures for environmental protection have been incorporated into the design and operations plans for the Soledad Mountain project. Monitoring will occur throughout construction, operation, and reclamation to assure these measures achieve the results intended. Performance evaluation will occur on a routine basis to assure compliance with regulatory standards and to serve as an early warning system. An onsite employee will be assigned to coordinate the monitoring program.

An overview of planned environmental protection measures and monitoring is provided in this section. It is anticipated that some of the measures described will be modified and that additional measures may be added during the permitting process.

The Mitigation Monitoring Program in Section 7.0 describes additional monitoring required to ensure specified mitigation measures resulting from the permitting process are adequately implemented and effective.

#### 2.2.4.1 Water Quality Protection and Monitoring

The Proposed Action will comply with all applicable regulations relating to hydrology and water quality. Water quality protection and monitoring is accomplished through cooperation with the Lahontan Regional Water Quality Control Board. The Lahontan Regional Board regulates all project systems with the potential to impact water quality of surface or subsurface waters. The project review and permitting process will follow requirements of Title 23 CCR, Chapter 15, Article 7 (Mining Waste Management), the California Health and Safety Code, Chapter 6.67 (Above Ground Storage of Petroleum), the California Porter-Cologne Water Quality Act of 1985, and other applicable laws and regulations.

In compliance with applicable regulations, the Lahontan Regional Board will require the use of materials and procedures to safely contain ore processing solutions, in order to achieve the closed, zero-discharge system proposed for the project. These requirements include:

- Low permeability liner systems for solution and reagent containment within the heap leach pads, the process plant, the agglomeration and conveyor system, and the solution storage tanks.

- A leachate collection and recovery system (LCRS) designed to monitor and collect any solution which may pass through the upper liner.

- A perimeter dike around the heap leach pads designed to contain solution from the leach pads and the 100-year, 24- hour storm event.

- Drainage or diversion ditches outside the processing solution area to preclude entry of storm runoff into the system.

- Monitoring of storm water runoff, the vadose zone (the unsaturated zone between the liner and groundwater), and groundwater for constituents of concern using statistical analysis.

- Quarterly reports on monitoring results and the current status of operations.

- Neutralization of the heap leach pile at the time of closure.

The Lahontan Regional Board will implement these requirements through detailed design review, issuance of waste discharge requirements, and yearly inspections.

The Lahontan Regional Board requirements will also include posting of financial assurance by the project proponent. Financial assurance for neutralization and closure of the heap leach pile will be posted in accordance with Title 23 CCR, Section 2580(f). An amount sufficient to initiate and complete corrective actions for any reasonably foreseeable potential release to the environment will be posted in accordance with Title 23 CCR, Section 2550.0(b).

The overburden piles will be regulated by the Lahontan Regional Board. It has been demonstrated that the acid generation potential of the overburden material is low and does not constitute a threat to surface or subsurface water.

The Lahontan Regional Board regulates storage of petroleum products in above ground tanks exceeding 660 gallons in capacity. Requirements for bulk oil storage facilities include:

- Development of a detailed Spill Prevention Countermeasure and Control Plan prepared in accordance with the guidelines of 40 CFR, Part 112;

- Frequent visual inspections for leakage or deterioration of tanks, fittings, or containment facilities; and

- Secondary containment for the entire contents of the largest tank, plus adequate freeboard.

A General Construction Activity Storm Water Permit will be obtained from the Lahontan Regional Board to regulate storm water flows at the site during construction. Erosion and sedimentation will be minimized by the use of best management practices during construction.

During operation, flows upstream of the open pit area will be regulated by a series of channels, culverts and ditches designed in accordance with Kern County regulations for the Site Grading Plan. Surface flows upstream of the heap leach pads and waste rock piles will be diverted around the facilities by contouring, drainage ditches, and culverts. Since the facility is designed as a zero discharge facility, a General Industrial Activities Storm Water Permit will not be required during the mine operation.

In addition, the BLM will ensure compliance with 43 CFR, 3809 regulations and surface management policies for mining to avoid unnecessary or undue degradation by regulation of surface drainage modifications and erosion control measures implemented

during site construction, operation and reclamation. The BLM requirements will include minimizing surface disturbance, use of riprap, water bars and other stabilization measures as necessary to control erosion and reseeding of areas not subject to additional disturbance. The BLM will exercise authority through review and approval of the project design and operations in conjunction with issuance of the Plan of Operations. The Plan of Operations will include stipulations under which the project will be required to operate. The BLM will also perform annual inspections.

Kern County will regulate reclamation activities related to stabilization of drainages and erosion control to assure consistency with SMARA requirements. This authority will be implemented through Reclamation Plan review and approval. Kern County will conduct inspections annually to assure compliance.

#### 2.2.4.2 Air Quality Protection and Monitoring

Pursuant to requirements of the Kern County Air Pollution Control District and the California Air Resources Board, extensive controls and operational features are incorporated into the project design to minimize impacts to air quality. Key features include:

- Appropriate dust suppression techniques used on roads and disturbed surfaces, including water spray and chemical suppressants.
- Crushing, screening, and conveying equipment will employ Best Available Control Technology including water spray, covered conveyors, and transfer points with baghouse dust collectors.
- Overburden piles reclaimed as soon as possible to reduce surface area exposed to wind erosion.
- Low sulfur diesel fuel used in all heavy equipment internal combustion engines.

- Onsite vehicles and equipment maintained on a regular basis.
- Monitoring of cyanide concentrations at leach pads and process facilities.
- Minimizing HCN emissions by controlling pH of cyanide solution.
- Monitoring mercury concentrations in retort facility to reduce mercury emissions.
- Record keeping of tons of rock moved, amount of fuel used, amount of water used, and crusher system throughput.
- Road maintenance on a routine basis.

Golden Queen intends to establish a meteorological monitoring station and $PM_{10}$ upwind and downwind monitoring stations to ensure that the ambient air quality standard in the vicinity of the project site is maintained in accordance with federal and state ambient air quality standards. Data collected will be reported to the Kern County Air Pollution Control District and will be used to verify that impacts do not exceed those predicted by modeling and to document compliance with air quality permit restrictions.

#### 2.2.4.3 Biological Resources Protection and Monitoring

Surveys of the biological resources, plant and animal life have been conducted on the site. No listed, that is endangered, threatened, candidate, proposed or rare, plants or animals have been observed on the project site. Golden Queen, in conjunction with Kern County and the BLM, has consulted with the United States Fish and Wildlife Service (the Service) and the California Department of Fish and Game (CDFG) with regard to the findings of the wildlife surveys.

An additional survey for wildlife will be conducted prior to the start of construction. If any listed species are identified, appropriate actions will be taken including additional consultation with the Service and the CDFG.

The boundaries of the area required for construction and operation will be clearly marked to prevent unnecessary disturbance. Off-road vehicle traffic will be restricted. The heap leach pads and process facilities will be surrounded by a fence designed to exclude people and large animals.

Employee training will include a wildlife education program. Employees will be acquainted with procedures to follow should wildlife be encountered. Project waste and garbage will be controlled so as not to attract wildlife.

In order to prevent animal contact with the process solution, the project has been designed to maintain solution in a closed system. The solution will be applied to the top of the heap by drip emitters. The agglomeration of the ore particles and grading of the top of the heap will prevent localized ponding of solution on the heap. The solution will be contained within the heap to prevent animal contact. Animal deaths on the property are required to be reported to the BLM on a monthly basis. Should an animal death occur, measures will be taken to prevent a reoccurrence.

Reclamation to restore the natural habitat of the project site will take place according to SMARA as described in Section 2.2.5.

#### 2.2.4.4 Visual Resource Preservation

Measures that will be implemented to reduce the visual impacts of the project include the following:

- Neutral colors will be used on the structures and stationary equipment to blend with the surrounding natural materials and minimize visual impacts;

- Areas around office buildings will be landscaped with native plants which will reflect the surrounding vegetation; and

- High intensity lighting around operating and maintenance areas will be shielded and directed towards the work area to reduce offsite glare at night.

Dust generation will be controlled as discussed in Section 2.2.4.2.

#### 2.2.4.5 Reclamation Progress Monitoring

A reclamation plan (prepared by Bamberg Associates, Appendix VI) will be approved and monitored by Kern County through the Surface Mining and Reclamation Act. A description of the reclamation procedure is in Section 2.2.5.

During operation, reclamation activities and monitoring include grading and seeding of already disturbed areas which will not be affected by the project, onsite seed collection, and test plots to evaluate reclamation methods. Topsoil with potential for use as growth media will be salvaged and stored for use as cover during reclamation. Annual reporting will include total acreage newly disturbed, total acreage reclaimed, total acreage unreclaimed, estimated amounts of growth media salvaged and reused, and the progress and evaluation of revegetation test plots.

Final reclamation will include removal of structures and facilities, grading and contouring of the heap leach and overburden piles, placement of growth media, seeding, and control of noxious weeds. After termination of operations and subsequent to implementation of final reclamation measures, a report of the reclamation efforts will be provided to Kern County and the BLM. Conformance with the final reclamation plan will be evaluated in this report.

Following final reclamation, the site will be inspected on a quarterly basis for three years and then on a schedule approved by Kern County and the BLM.

A vegetation baseline study has been completed. The Reclamation Plan recommends that the standards for revegetation be set at 35% of the vegetative cover (amount of surface covered by plant canopies), 20% of the density (number of perennial plants per unit area), and 30% of diversity (number of different species in a sample area) as compared to the baseline study results. The revegetation success monitoring will utilize sufficient sample sizes to determine an 80 percent confidence level.

Golden Queen will be required to provide financial assurance for the successful completion of reclamation. The bond will be released when reclamation is deemed complete by Kern County and the Office of Mining and Reclamation.

#### 2.2.4.6 Noise Protection and Monitoring

A baseline ambient noise level study and calculations of projected noise levels have been completed for the proposed project showing that noise levels will remain within the guidelines of the Noise Element of the Kern County General Plan.

Measures which will minimize the effect of noise as a result of the project are:

- Construction activities will take place primarily during the day.
- Internal combustion engines will be equipped with mufflers.
- Blasting will occur during daylight hours, generally on weekdays.

#### 2.2.4.7 Cultural Resources Protection

The entire project site has been surveyed for sites and items of archaeological interest and value according to the requirements of the state (private land) or federal (BLM land) governments. The initial surveys, designed to identify areas of interest, were completed on the entire property. Areas of interest were subject to a second survey which consisted of test excavations and determinations of site significance.

Four sites on private land were found to have significance. Two of the sites are in the area of the number 1 heap leach pad and two of the sites are in the area of a proposed haul road between the pit and the processing facilities. Architectural recording and salvage excavations were undertaken at these sites as an alternative to avoidance and site preservation. The Echo Mill Site (CA-KER-4450H) and two identified prospecting areas (CA-KER-4695H and CA-KER-4693H), are of minor interest, but will have an archaeological monitor review the areas during grading activity to record and collect any additional archaeological information that may be uncovered during such activity.

A visitor outlook and display area will be established to provide information to the public concerning historical mining activities onsite and in the surrounding areas. Artifacts from the four sites may be included in the displays.

### 2.2.5 Reclamation Plan

#### 2.2.5.1 Proposed Actions

Federal and state regulations require reclamation as part of all mining projects. The reclamation activities are defined in Title 14 CCR, 3500 and 43 CFR, 3809.1-3(d). The Soledad Mountain Reclamation Plan, presented in Appendix VI, addresses the disturbance which will result from the Proposed Action as well as the existing disturbed areas within the project boundary. The goals of the Proposed Reclamation Plan are consistent with the land use goals contained in the Specific Plan for Soledad Mountain - Elephant Butte & Vicinity - South of Mojave, including future mining, wildlife habitat, and open space.

The goals of reclamation according to state regulations as defined in the Surface Mining and Reclamation Act of 1975 are:

(a) To assure that adverse environmental effects are prevented or minimized and that mined lands are reclaimed to a useable condition.

(b) To encourage the production and conservation of minerals while giving consideration to values relating to recreation, watershed, wildlife, range and forage, and aesthetic enjoyment.

(c) To assure that residual hazards to the public health and safety are eliminated.

One goal of Federal regulations is to prevent unnecessary or undue degradation of Federal lands during operations. Unnecessary or undue degradation is defined as: surface disturbance greater than normal as a result of the project; failure to initiate and complete reasonable mitigation measures including reclamation of disturbed areas; and failure to comply with environmental protection statutes and regulations. Reclamation as defined in 43 CFR, 3809.1-3(d) includes;

(1) planning access routes of a minimum width following natural contour lines where possible;

(2) disposal of waste produced by the operations in such a way as to prevent unnecessary or undue degradation; and

(3) beginning reclamation at the earliest feasible time.

The Proposed Reclamation Plan will return the land to a post-mining land use similar to the pre-mining land use, ensure public safety, and prevent unnecessary or undue degradation of the land. The Proposed Reclamation Plan includes measures for:

- protection of wildlife and the public;
- minimization of erosion and minimization of the potential for slope failure in the pit, overburden piles and heap leach;
- demolition and removal of structures;
- neutralization of process components;
- salvage and storage of topsoil for growth media;
- revegetation with seeds collected from the site and vicinity;
- reduction of the slope on overburden piles;
- contouring and surface preparation of top horizontal surfaces of overburden piles;

- contouring and surface preparation of the top and sides of the heap leach pads;
- contouring and surface preparation of exploration disturbances and production support facilities sites; and
- revegetation of the prepared surfaces of the overburden piles, heap leach pads and support facilities sites.

The objective of the reclamation activities is to establish a productive ecosystem through revegetation and wildlife habitat development and to achieve visual harmony with the surrounding area. Reclamation activities at the proposed project will be initiated concurrently with the operation when individual sites or facilities are no longer required. Removal of facilities, rough grading and scarifying activities may occur at any time during the project. Mining operations will stop when ore reserves are exhausted. Operation of the heap leach and recovery process will continue beyond the end of mining operations and will cease upon reaching uneconomic recovery rates.

Approximately 215 acres of the project area have been disturbed as a result of previous mining, milling and exploration activities. Previously disturbed land affected by the Proposed Action will be reclaimed consistent with the reclamation plan. Appropriate previously disturbed areas near or adjacent to the Proposed Action will also be reclaimed in a manner consistent with the reclamation plan where possible. Each of these sites will be reviewed on a case by case basis, since access to some of these areas may create more disturbance than would be reclaimed.

Golden Queen will provide financial assurance to guarantee that reclamation activities can be completed at no public expense in the event the sponsor does not complete all required reclamation activities. The acceptable financial assurance mechanisms include surety bonds, irrevocable letters of credit and trust funds.

### 2.2.5.2 Impact on Future Mining

Implementation of the Proposed Reclamation Plan will not limit future development of mineral resources in the area. Currently subeconomic precious metal resources contained in the walls and floors of the open pit mines will remain accessible for future development. Future advancements in knowledge and understanding may result in additional discovery and development. Permanent project structures, such as heap leach pads and overburden piles, have been located where it is unlikely that additional mineral resources will be discovered.

### 2.2.5.3 Equipment and Structures

All portable and salvageable structures will be relocated or removed from the site. Permanent structures constructed for the project will be dismantled and removed or converted to another approved continuing use. All foundations will be broken up and buried under at least one foot of clean fill material. All surplus materials, storage containers and trash will be transported to a landfill authorized to accept this material. The remaining waste products and all fuel and similar materials will be removed from the site and disposed of according to state and federal regulations. Any soil material contaminated by regulated waste materials will be disposed of in accordance with state and federal requirements.

All water wells and monitoring wells, if and when abandoned, will be abandoned according to the state and county requirements as specified in the California Well Standards, Bulletin 74-90 or other regulations in force at the time of abandonment.

### 2.2.5.4 Overburden Piles

Upon final mine closure, the tops of the overburden piles will be graded to control erosion, break up compaction and form shallow basins to stimulate revegetation. Sharp edges will be rounded and straight lines will be altered to provide contours which are visually and functionally compatible with the surrounding terrain. The sides of the

overburden piles will be graded to a final slope of 1.8:1.0 (horizontal to vertical). Revegetation of the flat surfaces will be accomplished as described in Section 2.2.5.6.

#### 2.2.5.5 Heap Leach Pads

Industry experience with heap leaching has demonstrated that the spent ore can be neutralized by washing in place with water at the end of the leach cycle. Spent ore, which will be left on the heap leach pads, will be rinsed until the following general requirements of the Lahontan Regional Board have been met:

- Weak Acid Dissociable (WAD) cyanide in effluent rinse water less than 0.2 mg/l
- Contaminants in any effluent from the processed ore which will result from percolating meteoric waters will not degrade surface or groundwater.

Detailed requirements will be issued by the Lahontan Regional Board as part of their Waste Discharge Report, which will be issued prior to the commencement of mining activities.

The spent ore remaining on the heap leach pads will be reclaimed by neutralization, grading, and seeding. Neutralization of the heap leach piles will be accomplished by rinsing with fresh water and through natural degradation to reduce cyanide levels to meet Report of Waste Discharge requirements. With agreement from the Lahontan Regional Board, the time required for neutralization may be reduced by supplemental destruction of cyanide achieved by chemical, biological, or other acceptable and demonstrated technologies. The supplemental technology that may be best suited for use at the Soledad Mountain Project will depend upon specific site conditions at the time of neutralization. Sampling and laboratory testing will be conducted to evaluate the neutralization process at the conclusion of heap rinsing.

The design of the heap leaching pads and facilities at the Soledad Mountain Project allows for neutralization of the spent ore concurrent with the operation of the mine. The leach pads will be built in discrete, self contained sections called cells. Each of the seven planned cells will be operated and neutralized in sequence.

In general, a given cell will have ore placed upon it in thirty foot high lifts and each lift will be leached for precious metals recovery. This sequence will continue in cycles until the ore holding capacity of the cell is reached. At that point ore stacking will commence, using the same procedures, on the next cell.

As the operating transition is made from one cell to the next, leaching will take place on both cells until precious metals recovery from the first cell reaches its economic optimum, which is expected to take about six months. After that, the leached cell will enter the neutralization phase.

Neutralization will be accomplished by utilizing fresh water rinsing and by allowing natural degradation of cyanide to occur. The fresh water will be applied directly to the ore being neutralized through the same emitter systems that are used for leaching. When recovered in the cell sump, it will be transferred to the cell that is under active leaching for use as process solution make-up.

Periodically, a cell being rinsed will be allowed to "rest", which allows air to circulate within the heap and promotes continued degradation of cyanide. This rinse - rest cycle will continue until the ore is neutralized such that it meets the Lahontan Regional Board criteria. This process may go on for an extended period of time, depending upon the rate of neutralization that occurs and the fresh water make-up requirements of the process.

During the neutralization process, effluent waters from the portion of the heap being neutralized will be sampled and analyzed to determine the pH and free cyanide content. When these samples indicate that neutralization is complete, contact will be made with the Lahontan Regional Board and a solids sampling protocol will be presented for approval.

This protocol will include a program to recover representative samples of the rinsed, spent ore for analysis, a listing of elements for which the samples are to be analyzed, sample analysis procedures, the basis upon which the data will be compiled and conclusions formed, and any other criteria that is relevant at that time.

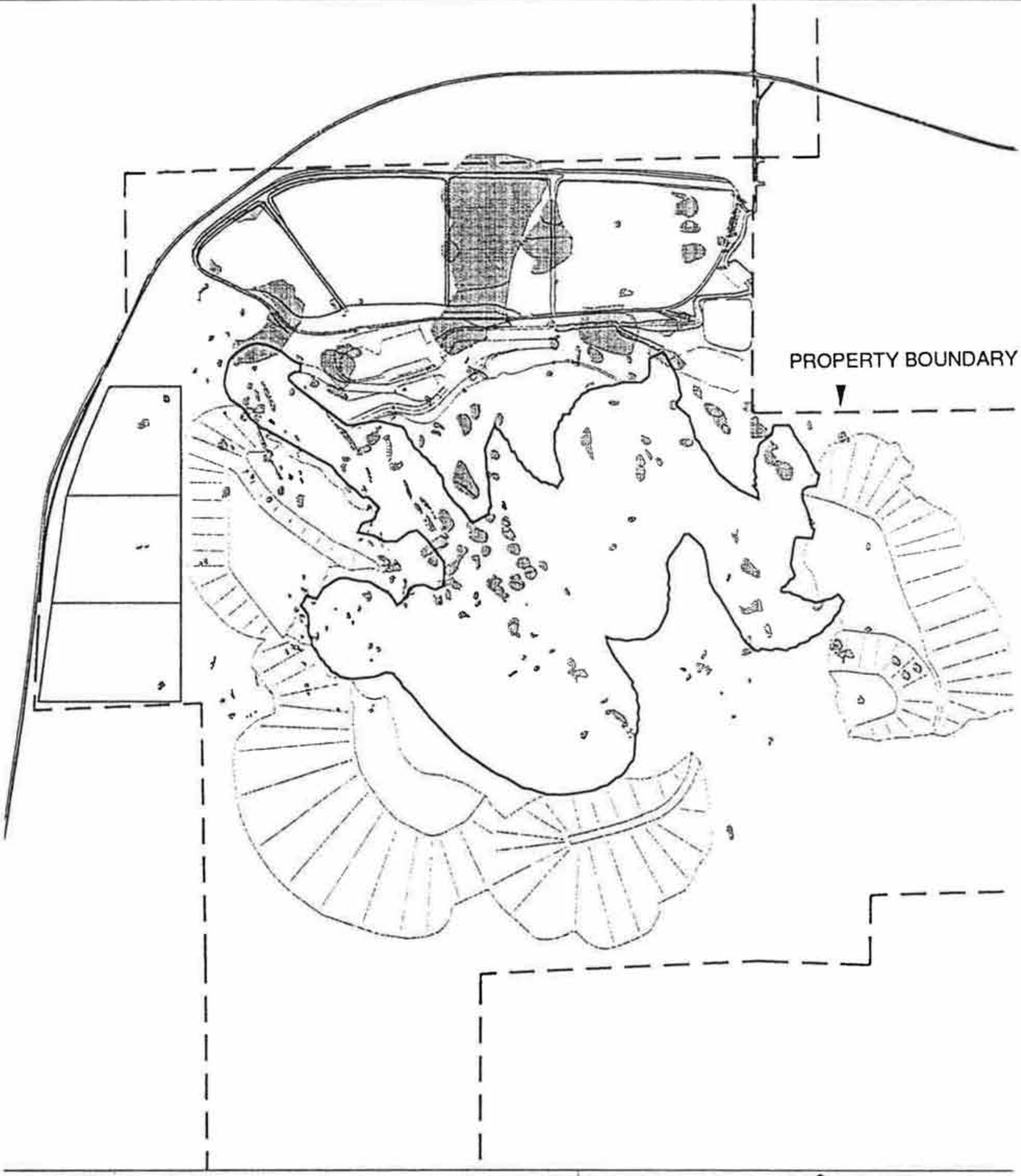
Once neutralization of a heap leach piles has been completed, all remaining process waters and rinse solutions will be neutralized, if necessary, and disposed of by evaporation or by application to land, in accordance with Lahontan Regional Board requirements.

After rinsing and neutralization are complete, the top of the heaps will be graded with a slight crown to reduce the amount of precipitation which will be retained on the heaps and percolate through the spent ore. The down slope of each heap leach pile will be finished to a 2.5:1.0 (horizontal to vertical) and the side slopes will be graded to 2.0:1.0 (horizontal to vertical). Some benches may be retained on the slope faces to facilitate drainage and erosion control.

#### 2.2.5.6 Revegetation

The revegetation and contouring portions of the reclamation plan for the Soledad Mountain Project have been prepared by Bamberg Associates and are attached as Appendix VI. The plan focuses on the procedures involved in establishing a productive ecosystem through revegetation and wildlife habitat development and achieving visual compatibility with the surrounding landscape.

The project is located on Soledad Mountain with elevations ranging from 2,700 feet at the base to 4,190 feet at the highest peak. Slopes are steep with rock outcrops and residual weathered rock with limited soil materials below the outcrops. The climate is typical desert with hot, dry summers (70 to 105 degrees Fahrenheit) and cool winters (27 to 60 degrees Fahrenheit) with some moisture. The soil materials are generally rocky or pebbly loams on the slopes, and sandy loams on alluvial fans and flats. Previous mining and exploration activities on Soledad Mountain have resulted in approximately 215 disturbed acres as shown in Exhibit 2.2-12.




0 1500' 3000'

APPROXIMATE SCALE IN FEET

Golden Queen
MINING CO. INC.

PRE-EXISTING
DISTURBANCE

WZI INC.
BAKERSFIELD, CALIFORNIA

GOLDEN QUEEN MINING COMPANY INC.
Soledad Mountain Project

PRE-EXISTING DISTURBANCE

| DATE 11/96 | 0733.0010 | EXHIBIT 2.2-12 |
|---|---|---|

LEGEND

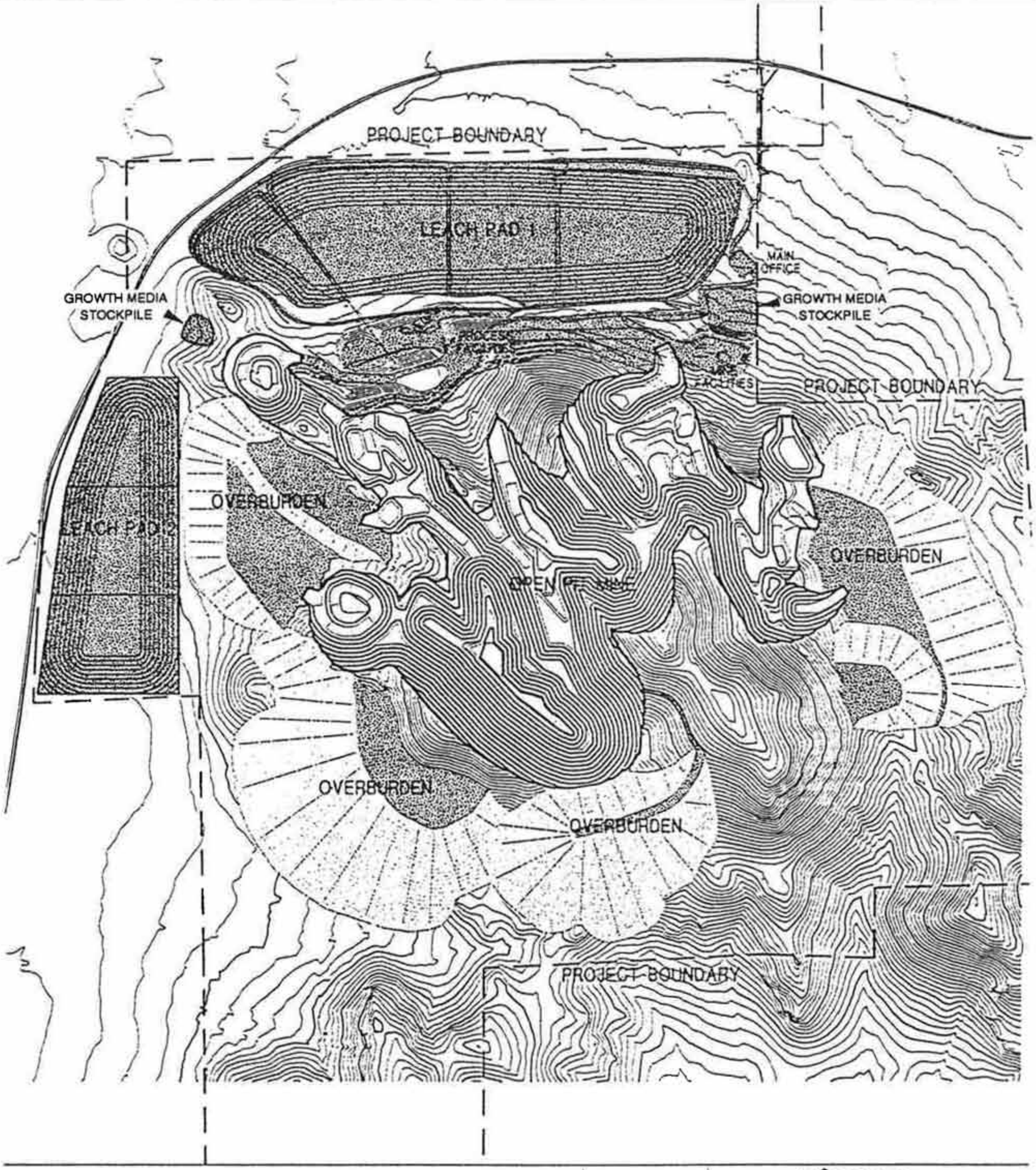
DISTURBED AREAS

The project site contains plant species typical of the Western Mojave Desert in the Antelope Valley. There are no threatened or endangered plant species expected or observed onsite. The vegetation is a creosote/burro bush type on the flats and alluvial fans below the mountain and a mixed shrub/grass type on the mountain slopes. Wildlife is diverse, but populations are low and activity seasonal. The results of biological inventories for vegetation and wildlife are contained in the Biological and Soil Resource Evaluation for the Soledad Mountain Project prepared by Bamberg Associates is attached as Appendix VII. Activities which have had the most influence on biological and soil resources are the historical mining and exploration and repeated fires which have highly altered the vegetation.

Revegetation testing programs at other mining sites in the California desert have confirmed that revegetation of disturbed areas such as this can be successful. The testing programs are discussed in greater detail in the Reclamation Plan (Appendix VI).

The results of these testing programs form the basis for the general approach to reclamation at Soledad Mountain. This approach entails the following elements.

1. The project will be revegetated by establishing surface drainage control and small catchment basins that are capable of sustaining vegetation without artificial irrigation. Revegetation will use seeds contained in the growth media supplemented by local seeds collected from the immediate areas.
2. A reclamation standard for vegetation on the reclaimed surfaces will be established by appropriate sampling of adjacent vegetation types and habitats. The goal is a productive self-sustaining ecosystem consistent with the conditions at the reclaimed sites.
3. The project will be returned to open space as the primary land use objective.
4. The reclamation plan calls for direct revegetation of 375 acres of the total 930 acres disturbed. Portions of the project site will not benefit from revegetation due to steep slopes, poor topographic conditions and harsh, desert climate with poor soil substrate conditions. The 375 revegetated acres includes the heap leach pads, plant facilities, unnecessary roads, top horizontal portions of overburden piles, a portion of the pit haul road and flat surface areas (Exhibit 2.2-13). The




0 1500' 3000'

APPROXIMATE SCALE IN FEET

Golden Queen Mining Co. Inc.

SOLEDAD MTN. PROJECT
GENERAL FOOTPRINT MAP

**WZI INC.**
BAKERSFIELD, CALIFORNIA

**GOLDEN QUEEN MINING COMPANY INC.**
**Soledad Mountain Project**

REVEGETATION AREAS

| DATE 11/96 | 0733.0010 | EXHIBIT 2.2-13 |
|---|---|---|

LEGEND

REVEGETATION AREAS

haul road corridors will receive some natural revegetation from nearby undisturbed areas.

Project reclamation is designed to match the native setting with a combination of surface preparation that takes advantage of natural precipitation and an appropriate seed source. Consequently, the reclamation standards for success and bond release on the project site will use a combination of reclamation activities and revegetation results.

Reclamation efforts include the removal and storage of growth media during project construction and operation for use during revegetation. The growth media stockpiles will contain seeds that will cause the stockpiles to produce vegetation, thereby protecting the stockpiles from erosion. Revegetation standards will be based on a percentage of the cover present on corresponding natural vegetation types. Reclamation implementation is discussed in greater detail in the Reclamation Plan and Revegetation Procedures report (Appendix VI).

The baseline studies on which the revegetation standards are based, documenting cover, density and species richness, are presented in Section 4.0 of the Biological and Soil Resource Evaluation attached as Appendix VII. A preliminary seed mixture for revegetation has been developed as a result of the baseline documentation and results of the existing test plots in the Mojave Desert. Revegetation is expected to include a seed mixture similar to that shown in Table 2.2-5.

Monitoring of reclaimed areas will occur following reclamation efforts. The Reclamation Plan recommends that the standard for vegetative cover for this project be set at 35% as compared to baseline test plots. Monitoring will include comparison of plant establishment in reclaimed areas with data collected concurrently in adjacent undisturbed areas. The revegetation success monitoring will utilize sufficient sample sizes to determine an 80 percent confidence level.

# TABLE 2.2-5

## PRELIMINARY PLANT SEED MIXTURE FOR REVEGETATION

| | |
|---|---|
| Shrubs | |
| *Acamptopappus sphaerocephalus* | goldenhead |
| *Ambrosia dumosa* | burrowbush |
| *Atriplex confertifolia* | shad scale |
| *Atriplex polycarpa* | cattle spinach |
| *Chrysothamnus nauseous* | rubber rabbitbrush |
| *Encelia virginensis* | acton encelia |
| *Ericameria cooperi* | goldenbush |
| *Eriogonum fasciculatum* | california buckwheat |
| *Eriogonum plumatella* | flat-top buckwheat |
| *Grayia spinosa* | spiny hop-sage |
| *Hymenoclea salsola* | cheesebush |
| *Krascheninnikovia lanata* | winter fat |
| *Larrea tridentata* | creosote bush |
| *Xylorhiza tortifolia* | mojave-aster |
| Grasses | |
| *Poa secunda* | bluegrass |
| *Pleuraphis rigida* | big galleta grass |
| *Trisetum canescens* | trisetum |
| Herbaceous Perennials and Annuals | |
| *Camissonia brevipes* | evening primrose |
| *Chaenactis fremontii* | fremont's pincushion |
| *Dalea mollis* | soft indigo |
| *Eriogonum trichopes* | little trumpet |
| *Lupinus brevicaulis* | sand lupine |
| *Malacothrix californica* | desert dandelion |
| *Phacelia glandulifera* | tackstem phacelia |
| *Platystemon californicus* | cream cups |
| *Salvia carduacea* | thistle sage |

Noxious weeds are not expected to be a problem, however, weeds will be controlled if the revegetation efforts are threatened. The most likely weed species is the Russian thistle (*Salsola australis*). The Russian thistle often establishes for four or five years during early stages of revegetation. The plant acts as a nursery plant or successional plant which dies as revegetation occurs.

Previous tests in similar desert conditions have determined that the optimal time to plant is immediately after the surface has been prepared for revegetation. Seeds sown shortly after surface preparation, while the soil is loose, are easily covered and will remain dormant untill sufficient rainfall is received. Therefore, planting will occur immediately after surface preparation (irrespective of season) to enhance revegetation efforts.

#### 2.2.5.7 Erosion

Slopes will be shaped for reclamation depending on the type of material, erodibility, and configuration left by the mining process. The slopes of the final pit wall will be 55 to 63 degrees. The downslope portions of the heap leach will be 2.5:1.0 (horizontal to vertical) and the side slopes will be 2.0:1.0 (horizontal to vertical). The slopes of the overburden piles will be built to 1.8:1.0 (horizontal to vertical). After closure, the pit high walls will be left in a safe and stable configuration, subject to natural processes.

Storm water surface flows will be routed away from the heap leach facilities. Methods to be employed, if necessary, will include berms, sediment ponds, check-dams composed of rice straw bales, sand bags, silt fences, or other temporary techniques to minimize impacts. Erosion control methods will be designed to handle a 20-year, 1-hour intensity storm event, in accordance with standards established by Title 14 CCR, 3706(d) (SMARA regulations), and deliver diverted storm waters to natural drainages at velocities that minimize erosion.

If excessive erosion and sedimentation are observed during the mining operations, modifications to the erosion control methods will be made to ensure that land and surface water will not be adversely impacted. At all times erosion and sedimentation control will be performed as per the directions of the Lahontan Regional Board in the Waste Discharge Requirements (WDR) and the Site Grading Plan approved by Kern County.

#### 2.2.5.8 Financial Assurance

Reclamation bonding will be provided by Golden Queen, as required by SMARA, the BLM and the Lahontan Regional Board, to assure that all proposed reclamation activities and those required as conditions of permit approval can be completed at no public expense in the event that the project sponsor does not meet this obligation. Golden Queen will post a bond, irrevocable letter of credit, or another acceptable financial instrument which will be sufficient to guarantee the completion of reclamation.

### 2.2.6 Project Phasing

Based upon the currently available exploration data and land position, the full scope and capacity of the proposed project, including that which is reasonably foreseeable, is addressed in this document.

Mining will follow an engineered sequence of extraction based on depth, accessibility, grade of ore, and other engineering and economic considerations. Development of overburden piles will occur as mining progresses.

The heap leach pads will be constructed to the maximum final dimensions in phases that will occur as required. Ore transportation and conveying systems from the agglomeration facility to the heap leach pads will be constructed and extended as required by heap leach pad expansion.

The process plant, maintenance shops, offices and other support and ancillary facilities will be constructed as part of the initial project development effort, either in part or in whole, and expanded to final dimensions as necessary.

### 2.2.7 Permit Requirements

Golden Queen will be subject to numerous local, state, and federal permit requirements. The lead agencies and required permits for the project are shown in Table 2.2-6.

**TABLE 2.2-6**
**Permits Required for the Soledad Mountain Project**

| AGENCY/DEPARTMENT | PERMIT/APPROVAL |
|---|---|
| FEDERAL AGENCIES | |
| Bureau of Land Management | Plan of Operations |
| | Cultural/Paleontological Resource Permit (National Historic Preservation Act, 16 USC 47) |
| Fish and Wildlife Service | Section 7 Consultation |
| Bureau of Alcohol, Tobacco and Firearms | Purchase, Storage, or Transportation of Explosives Permit |
| Environmental Protection Agency | Toxic Chemical Release Inventory System |
| Mine Safety and Health Administration | Mine Identification Number |
| STATE AGENCIES | |
| State Water Resources Control Board Regional Water Quality Control Board | General Construction Activity Storm Water Permit |
| | Waste Discharge Permit |
| California Department of Fish and Game | Consultation |
| State Office of Historic Preservation (SHPO) | Section 106, (National Historic Preservation Act, 16 USC 470): Designation, survey, determination of effect |
| California Occupational Safety and Health Administration (Cal OSHA) | Construction Permit |
| | Explosive Blaster's License |
| | Process Safety Management Program |
| KERN COUNTY | |
| Planning Department | Environmental Report |
| | Mining/Reclamation Plan and Financial Assurance |
| | Conditional Use Permit |
| | Grading Permit |
| | Road Encroachment/Road Vacation |
| | Building Permit |
| Environmental Health | Sewage Disposal System Permit/Water Well Drilling Permit |
| Fire Department | Hazardous Materials Business Plan |
| | Hazardous Materials Inventory |
| | Fire Protection Plan |
| Air Pollution Control District | Authority to Construct |
| | Permit to Operate |

## 2.3 Alternatives

### 2.3.1 Objectives of Alternatives Analysis

NEPA regulations require that an EIS include analysis of alternatives to the Proposed Action. The BLM's *National Environmental Policy Act Handbook* (USDI, 1988) requires that an EIS describe the No Action (No Project) Alternative and all reasonable alternatives identified by the BLM to the same level of detail as the Proposed Action, and how each alternative, with the exception of the No Action Alternative, will generally accomplish the purpose and need of the proposed project. For NEPA purposes, reasonable alternatives include those that are practical or feasible from technical and economic standpoints (46 Federal Register 18026; 3/23/81, as amended, 51 Federal Register 15618; 4/25/86). The NEPA Handbook requires that an EIS describe alternatives considered but eliminated from detailed analysis and provide a brief rationale for their exclusion from consideration.

CEQA requires an EIR to describe a reasonable range of alternatives to the project, or to the location of the project, which could feasibly attain the basic project objectives, and evaluate the comparative merits of these reasonable alternatives (CEQA Guidelines §15126[d]). This discussion must focus on alternatives capable of eliminating any significant adverse environmental effects or reducing them to a level of less than significant. An EIR need not consider alternatives whose effect cannot be reasonably ascertained and whose implementation is remote and speculative.

The primary objective of the requirements for evaluation of alternatives is to allow informed decisions for discretionary actions (e.g. permit approvals) related to the proposed project. Review of available alternatives allows evaluation of other methods of operation or locations of facilities that may be technologically and economically feasible and, if such alternatives are available, evaluation of whether or not their implementation would be capable of significantly reducing or eliminating adverse effects of the Proposed Action.

### 2.3.2 Alternatives Considered

A range of alternatives was considered during the preliminary project design and the preparation of this document. These alternatives addressed changes that might be made to the Proposed Action to eliminate or reduce any environmental impacts the Proposed Action may have. Alternatives reviewed for potential feasibility and/or comparative environmental effects include:

- No Action Alternative.
- Alternative mining and ore processing rates.
- Reduced project size.
- Alternative mining techniques.
- Mine backfilling alternatives.
- Alternative gold extraction techniques.
- Alternative project location and configurations.
- Alternative power supply.

Section 15126(d)(2) of the CEQA implementing guidelines requires that, of the alternatives addressed in an EIR, one be identified as "environmentally superior." If the environmentally superior alternative is the No Action Alternative, then the EIR shall also identify an environmentally superior alternative among the other alternatives.

Federal regulations require that an EIS identify the NEPA lead agency's "preferred alternative," if one exists (40 CFR, 1502.14[3]). The preferred alternative is the one that the lead agency believes will fulfill its statutory mission and responsibilities. Given that the lead agency's preferred alternative is identified, the EIS must objectively evaluate all of the alternatives.

Cost alone is not an overriding consideration for the BLM in their determination of the preferred alternative. The BLM staff, in their recommendations to management, must consider other factors in their examination of the range of alternatives. Other important factors include:

- Determining what is usual, customary and proficient in the mining industry in the western United States.
- Providing for a productive post-mining land use area after completion of mining (the management goal for productive post-mining use is "no net loss" to overall resource values and land use opportunities).
- Providing for measures to protect human health and safety.
- Providing reasonable measures to protect the scenic, scientific and environmental values of the area impacted by mining.
- Evaluating the potential for future mining from remaining mineralization that is not now economic.
- Considering the long-term and short-term impacts of alternatives as compared to the Proposed Action.
- Considering whether post-mining land management by the BLM will require an "active" program (i.e. inspection, compliance and enforcement by the BLM staff) or a "passive" program (as was the condition prior to mining).

The EIS should also identify the "environmentally preferable" alternative (46 Federal Register 18026; 3/23/81, as amended, 51 Federal Register 15618; 4/25/86). The environmentally preferable alternative is the alternative that best promotes the national environmental policy expressed in NEPA. Generally, this means the alternative that causes the least damage to the environment and best protects natural and cultural resources.

An environmental analysis of alternatives to the Proposed Action is contained in Section 4.0.

### 2.3.3 Alternatives to the Proposed Action Reviewed and Evaluated

This section presents those alternatives to the Proposed Action listed above which were reviewed and found to be sufficiently feasible for evaluation. These alternatives include:

- No action alternative.
- Alternative mining and ore processing rates (increased and decreased).
- Reduced project size.

Each of these alternatives are analyzed in detail in Section 4.0. Table 4.0-1 presents a summary of the environmental impacts of each alternatives in comparison to the proposed action.

#### 2.3.3.1 No Action Alternative

Implementation of the No Action Alternative will mean that the Soledad Mountain Project will not be developed. Golden Queen's exploration disturbances at the site will be reclaimed and no potential for increased environmental impacts due to the Proposed Action will exist. Surface disturbances that have been created by historical non-project related mining events will remain, and the present land uses will continue. The recent levels of commercial activity will diminish or disappear, and deterioration of significant cultural and historical resources will continue without preservation.

The "National Materials and Minerals Policy, Research and Development Act of 1890" has declared that "it is the continuing policy of the United States to promote an adequate and stable supply of materials necessary to maintain national security, economic well being, and industrial production with appropriate attention to a long-term balance between resource production, energy use, a healthy environment, natural resources conservation, and social needs." The No Action Alternative would be generally inconsistent with this policy.

SMARA encourages the production of minerals while giving consideration to environmental resources. The specific plan for Soledad Mountain - Elephant Butte and Vicinity - South of Mojave recognizes gold and silver mining operations as important past land uses and the protection of commercial value ores and deposits is incorporated through restriction of incompatible land uses. However, Kern County could adopt the No Action Alternative if any significant adverse environmental effects are identified which could not be mitigated to a level of Less Than Significant, or a Statement of Overriding Considerations under CEQA could not be justified.

### 2.3.3.2 Alternative Mining and Ore Processing Rates

This section describes two alternative approaches to the project that will consider the impacts associated with mining and processing ore at rates 20% higher and 20% lower than the 6 million tons per year in the Proposed Action. These alternatives provide a basis for comparing the environmental impacts that could result from a change in project scale and duration.

#### 2.3.3.2.1 Increased Mining and Ore Processing Rate Alternative

For purposes of analysis, the following assumptions are made regarding the increased rate alternative.

The total amounts of ore and overburden mined over the life of this alternative will be the same as for the Proposed Action, but the mining and ore processing rates will be increased by 20% to produce and process 4.8 million tons of ore per year. This will decrease the operational period of the project to about eight years, based upon the foreseeable (60 million tons) ore reserve.

Total surface disturbance and the site layout for this alternative will be the same as for the Proposed Action. Excavation of the same total tonnage of ore and overburden, but over a different period of time, will require the same mine, overburden and heap leach

pile configurations. Surface disturbances for onsite roads and ancillary facilities will be similar because the same basic transportation and access needs and supporting activities will occur. While individual buildings or pieces of equipment may be sized differently, for example, a larger crushing circuit might be used, most physical differences in disturbances will be negligible.

There will be a significant change in the employment level at the project, although any increase in employment will be by less than 20%.

The changes in environmental impact that could occur due to an increased mining and processing rate are primarily related to the duration of activities and the consumptive uses associated with project operations.

##### 2.3.3.2.2 Reduced Mining and Ore Processing Rate Alternative

For purposes of analysis, the following assumptions are made regarding the reduced rate alternative.

The total amounts of ore and overburden mined over the life of the alternative will be the same as for the Proposed Action, but the mining and ore processing rates will be reduced by 20% percent to produce and process 4.8 million tons of ore per year. This will increase the operational period of the project to about thirteen years, based upon the foreseeable (60 million tons) ore reserve.

Total surface disturbance and the site layout for this alternative will be the same as for the Proposed Action. Excavation of the same total tonnage of ore and overburden, but over a different period of time, will require the same mine, overburden and heap leach pile configurations. Surface disturbances for onsite roads and ancillary facilities will be similar because the same basic transportation and access needs and supporting activities will occur. While individual buildings or pieces of equipment might be sized

differently, for example, a smaller crushing circuit might be used, most physical differences in disturbances will be negligible.

There will be a significant change in the employment level at the project, although any decrease in employment will be by less than 20%.

The changes in environmental impact that could occur due to a reduced mining and processing rate are primarily related to the duration of activities and the consumptive uses associated with project operations.

#### 2.3.3.3 Reduced Project Size

This alternative evaluates the changes that will be made to the Proposed Action if it were to be designed to avoid impacting the topographic and visual resources at the project site. It is based upon the avoidance of mining in areas that will affect the primary ridge lines of Soledad Mountain, thus maintaining the basic silhouette of Soledad Mountain and reducing any impact on the visual character of the mountain.

This alternative also illustrates the effect of a general reduction in size of the project proposed for any other purpose.

In this alternative the amount of ore mined will be reduced to 17.4 million tons, a reduction of 70% from the foreseeable reserve. Overburden mined in conjunction with this amount of ore will total 44 million tons, also a reduction of 70%. Based upon a mining rate that will produce 6 million tons of ore per year (the same as for the Proposed Action), the mining life of this alternative will be about three years.

The potential environmental impacts resulting from this alternative will be primarily related to the change in area of disturbance and the reduced mine life.

The percentage reduction in total tonnage mined will not be reflected in a corresponding reduction in the surface area disturbed. This is because the volume to surface area relationship of the overburden piles and the heap leach pads tend to become less efficient with decreasing size and because the same basic amount of area is needed for facilities such as the process plant, offices, maintenance shops and other ancillary and support requirements.

The annual operating requirements for this alternative will be similar to the Proposed Action with regard to the number of employees, the scale of the operation, and consumption of reagents, water, operating supplies and maintenance supplies. The other operating impacts on the environment will also be similar to the Proposed Action, but the total effect of some, such as total water consumed, will be reduced due to the short project life.

### 2.3.4 Alternatives Considered and Eliminated

This section describes alternatives that were considered but were eliminated from further evaluation because they were determined to be not feasible, not capable of substantively reducing or eliminating environmental impacts, or not capable of satisfying the basic project objectives. Each of the alternatives evaluated is discussed in the following sections. The discussion of each alternative includes a brief description of the comparable aspect of the Proposed Action to provide a basis for comparison.

#### 2.3.4.1 Alternative Mining Techniques

##### 2.3.4.1.1 Proposed Open Pit Mining Technique

The configuration and character of the Soledad Mountain Project mineral resource was evaluated to determine the optimal technique for the Proposed Action. The resource occurs as mineralization in a series of epithermal veins, filled faults, and shear zones which vary in width up to 50 feet. Ore occurs to a depth of hundreds of feet. Overlying

and interspersed with the ore is non-goldbearing overburden material that must be removed to access the ore.

The proposed open pit mining method will consist of excavating the ore and overburden material required to access the ore. The ore material will be processed and the overburden material will be placed adjacent to the open pit mine. Strip mining and underground mining were evaluated as alternatives to the proposed open pit method.

###### 2.3.4.1.2 Strip Mining Alternative

Strip mining is a linear method of removal that is typically applied to shallow deposits of minerals such as coal, potash, or uranium which occur in horizontal seams. Such deposits are usually flat-lying sedimentary formations that extend over a substantial area. Strip mining is practical for such deposits because their recovery generally requires shallow excavation over a relatively large and contiguous area. In strip mining, only a portion of the waste rock and ore is initially mined. Then, as mining advances to the adjacent portion of the ore body, the waste rock excavated during the advance is permanently disposed of by placing it in the excavated area created during the earlier stage of mining. In this manner, the mining process acts as a moving trench that is filled in behind the area of active extraction.

This method is physically impossible for deposits such as those at the Soledad Mountain site, which have a relatively limited surface extent in comparison to their depth. Because of the configuration and depth of the project ore body, there is insufficient space within the open pit to dispose of overburden material from a portion of the open pit being actively worked into an area where mining has been completed. Instead, all of the overburden must be removed from the pit in order to expose the ore.

### 2.3.4.1.3 Underground Mining Alternative

Underground mining is typically suited to deep mineral deposits of high-grade veins and large disseminated deposits. Underground openings can be excavated leaving most of the host rock in place to support the overburden. This method of mining was utilized by earlier mining operations at the Soledad Mountain site, but is not suitable for bulk mining of the lower grade ores proposed to be mined. However, underground mining potential may exist at the project site if economic zones of higher grade ore are discovered or exposed.

### 2.3.4.1.4 Alternate Overburden and Processed Ore Disposal

An estimated 290 million tons of ore and overburden will be removed from the open pit in the Proposed Action. Overburden material will be deposited in the overburden piles adjacent to the mine. Crushed and leached ore will be deposited at the heap leach pile and remain there.

Due to the volume of material, the only potential alternative to overburden and processed ore disposal as proposed will be backfilling into the mine. Offsite hauling of either or both materials to another location will not positively affect the surface area requirements for placement of the materials, reclamation requirements, or the environmental impact of waste rock and ore disposal.

Backfilling concepts have been considered and found to be infeasible and impractical, as discussed in the following sections.

#### 2.3.4.2 Backfilling Alternatives

The Proposed Action is designed for the permanent disposal of overburden and ore from the mining operation to surface overburden piles and the heap leach pads, respectively. An alternative to this permanent surface disposal would be to backfill the overburden material and the processed, neutralized ore to the open pit.

This operation could reduce some of the long-term visual, biological and land use effects of the Proposed Action, however, this could also increase some of the long-term internal resource effects. The actual mechanics of a backfilling operation are dependent on the specifics of the type of ore body, the mining method, and the physical characteristics of the area. Backfilling of a previously mined area is typically used, as discussed earlier, at strip mines, where the mineral (frequently coal) exists in relatively well-defined horizontal or semi-horizontal zones or layers. Overburden can be removed from one area and immediately deposited in an adjacent mined area which contains no residual mineral potential, thereby minimizing costly double handling of the overburden material. The geometric relationship between ore and overburden in strip mines generally favors placing overburden material into the shallow cuts of areas previously mined. Backfilling of conical, open pit mines is more constrained by the logistics of the mining operation and physical characteristics of the materials mined. For example, these open pit mines usually cannot be backfilled until all of the material has been mined out. However, maximum backfilling is evaluated below as a potential alternative to the Proposed Action for the Soledad Mountain Project.

Open pits, such as proposed for the Soledad Mountain Proposed Action, are not generally amenable to backfilling, from both operational and economic standpoints. Surface storage of the overburden material is first required, creating an area of surface disturbance. Placement of material back into the pit after completion of mining will increase operational and capital costs, increase energy consumption, increase water consumption, extend the period during which noise will be generated, and adversely

affect air quality by extending the period during which combustion products and fugitive dust will be emitted.

The environmental advantages of backfilling would be that it reduces the long-term visual contrast of the project and allows the open pit area to be used for activities not otherwise possible without backfilling.

An additional consideration in evaluating the relative merits of backfilling is the conservation of mineral resources and energy. Complete or partial backfilling may be in conflict with objectives of federal and state mining policies, if additional minerals could be extracted from the open pit in the future. The Specific Plan for Soledad Mountain - Elephant Butte & Vicinity - South of Mojave recognizes gold and silver mining operations as important past land uses and protection of potential commercial value ores and deposits is incorporated through restriction of incompatible land uses. SMARA states that "...the reclamation of mined lands... will permit the continued mining of minerals and will provide for the protection and subsequent beneficial use of the mined and reclaimed land" (Section 2711[b]). The protection of remaining mineralization at a reclaimed mined site is also incorporated into federal regulations, such that "reclamation may not be required where the retention of a stable highwall or other mine workings is needed to preserve evidence of mineralization" (43 CFR, Part 3809.05[j]).

###### 2.3.4.2.1 Mineralization and Potential Reserves Constraints

The potential loss of additional mineral reserves, and the technical and economic constraints of backfilling for open pit mining, as discussed above, are applicable to the Soledad Mountain Project. The pit design is the optimal possible based on the current geological, engineering and economic data. The configuration of the open pit is designed using a number of factors: grade of the mined material; precious metal recovery rates; precious metal prices; mining costs; processing costs; pit wall slope stability; and physical and legal boundary constraints. Based on systematic evaluation

of these factors, the current pit design will allow for the extraction of at least 60 million tons of ore.

Precious metal mineralization extends beyond the planned limits of the open pit floors and walls. The walls and floor of the open pit contain gold mineralization which appears to be unfeasible to mine with current economic conditions and technology. However, changes in external conditions, such as fluctuating metals prices and improvements in technology, may result in revised open pit designs which increase the amount of economically extractable ore. If these materials left behind in the open pit floor and walls are buried due to backfilling requirements, the cost of recovering them in the future may be so high that they become entirely lost as a resource. In addition to the loss of potentially recoverable ore, geologists rely on rock exposures, especially with evidence of mineralization, as a primary source of information to guide their search for additional mineralization. Backfilling will preclude or seriously hamper geologists' ability to use the information in the open pit walls in their search for additional mineralization.

#### 2.3.4.2.2 Technical Constraints of Backfilling

Once an open pit has been mined, it is generally not possible to replace all the material excavated from the mine back into the mine, or to return the land surface to its original configuration, due to the physical constraints of the mined materials. Broken rock occupies a much greater volume than the same weight of solid rock. As a result of this expansion, or "swell factor", all of the rock mined from an open pit will not fit back into that open pit. Industry experience is that the "swell factor" for the ore and overburden is approximately 30 percent. The result would be that a certain percentage, in this case 30% or more, of the mined material could not be returned as backfill and would remain in the overburden piles requiring reclamation and stabilization.

#### 2.3.4.2.3 Economic Constraints on Backfilling

In contrast to the reclamation of strip mining operations, the cost of reclamation for most open pit metal mines greatly exceeds the value of the reclaimed land. Some of the highest reclamation costs can be generated by backfilling to the original contour, on the order of $55 million to $3.2 billion for individual metal mines (NRC, 1979). Assuming a cost of $0.80 per ton (USDI, 1990) for backfilling the mined material, the total cost for backfilling as part of the Soledad Mountain Project could be in excess of $160 million. Golden Queen has indicated that this will make the Soledad Mountain Project no longer economically feasible. This conclusion is supported by an analysis for the backfilling of the Castle Mountain Mine, an open pit gold mine located in San Bernardino County, California. Both mines have similar characteristics, with the exception that the grade of the ore at Castle Mountain Mine is greater than at the Soledad Mountain Project, presumably allowing the Castle Mountain Mine project a greater ability to support the cost of backfilling. The analysis indicated that the project would have had a negative net present value when the cost of backfilling was included (USDI, 1990).

An additional report, prepared by the Bureau of Mines, Western Field Operations Center, utilized a generic cost model which used a 0.055 ounce per short ton (oz/st) grade, a 2:1 strip ratio, 2,500-foot average haul distance, 75 percent gold recovery, and 65 percent backfill. Backfilling costs were estimated at $0.84/st in 1990 dollars for ore and overburden, plus a 25 percent mark-up to allow for contractor's costs, for a total cost of $1.05/st. A cash flow analysis was then performed which used a $400/oz gold price and 15 percent rate-of-return compared to net present value. The results indicated that backfilling will render an otherwise profitable operation unprofitable which will produce a major negative socioeconomic effect as compared to the Proposed Action.

#### 2.3.4.2.4 Maximum Pit Backfilling

This alternative would propose that the project fill the open pit to the greatest degree possible with material mined under the Soledad Mountain Project activities. This would essentially be a large earth moving project which would commence following the cessation of mining operations of the Soledad Mountain Project. Rock that had been

removed from the open pits during mining would be reloaded into trucks and returned to the open pit. It is assumed that backfill material will include all the overburden and spent ore mined as part of the Proposed Action, but not include materials mined by previously permitted operations.

Assuming the mine was refilled, approximately 145 million cubic yards (237 million tons) of material would be moved back to the open pit. At the planned mining rate of 30 million tons per year, this would require nearly eight additional years of loading, hauling, and dumping, as well as continued use and disturbance of the overburden piles, heap leach pads, open pit, access roads, and mine support facilities. There would be continued consumption of water (approximately 3,300 additional acre-feet), fuel (approximately 23 million gallons), and electricity. Noise, dust (approximately 93,000 lbs of $PM_{10}$ per year) and internal combustion engine emissions would continue to be generated over this period. Additional solid waste, such as tires, oil, filters, etc. would also continue to be generated. There would be eight additional years until most reclamation activities would begin and almost no concurrent reclamation activity could occur.

However, backfilling of the pit could reduce the visual impact of the Soledad Mountain Project area as a whole, as the open pit is located in the upper reaches of Soledad Mountain and, as such, is visible from State Routes 14 and 58, the principal visual observation points for the Soledad Mountain Project. Given the steep topography of Soledad Mountain, it is unlikely that a return to the original topography and vegetative state of the mountain is technically possible. Due to the swell factor, all overburden piles and heaps will not be removed in this backfilling process.

Based upon these considerations, the potential loss of natural resources and economic disadvantages of maximum pit backfilling will be substantially greater than the potential environmental advantages. Replacement of the overburden in the mined-out open pit will require numerous years of economically unproductive activity and energy use, with related environmental impacts that would not otherwise occur.

The economic burden of backfilling will place an unreasonable restriction on the statutory right of the federal claimant to remove mineral resources. This potential loss of mineral resources may also generate a "taking" under the US Constitution for the loss of a property right of the mineral claimant.

In consideration of these factors, this alternative is not judged to be a reasonable alternative to the Proposed Action.

#### 2.3.4.3 Alternative Gold Extraction Techniques

##### 2.3.4.3.1 Proposed Heap Leach Method

The proposed method for recovering precious metals from the ore is heap leaching, using dilute cyanide solutions, with Merrill-Crowe processing being used for recovery of precious metals from leach solutions. This is a conventional process that has been used for decades at other commercial gold producing operations with similar low-grade, disseminated ore bodies.

In the proposed heap leaching method, the ore will be crushed to reduce the particle size to a nominal minus 10 mesh (approximately 1/16 inch), exposing precious metals in the ore for leaching. To provide for increased recovery and solution percolation rates, the crushed ore is then agglomerated using cement and barren leach solution to form pellets approximately 0.10 to 0.40 inches in diameter. The agglomerates are placed on the heap where dilute cyanide solution is applied to the ore using drip emitters. Gold is dissolved by the solution and travels to a piping system on top of the liner at the bottom of the heap.

The precious metals containing solution is collected in a sump internal to the heap and pumped to the Merrill-Crowe process plant where it is clarified, deaeriated, and, using zinc dust, precipitated from solution as a precious metals sludge. This sludge is smelted to produce a gold and silver doré, which is shipped to a refiner for further processing.

Ore from which the precious metals have been recovered remains in place on the heap, where, at closure, it is neutralized, reclaimed and revegetated.

Alternative gold extraction methods could include conventional milling, vat leaching, and in situ leaching.

#### 2.3.4.3.2 Conventional Milling

Conventional milling generally consists of reducing the ore particles to a very small size (usually very fine sand and silt size particles) using capital intensive crushing and grinding equipment. This process further liberates minute precious metals particles and maximizes the exposed mineral surface area. Gold extraction is then accomplished in tanks by extracting the gold from the resultant slurry of the finely ground particles mixed with water and chemical reagents. Total precious metals recovery for milling processes is generally higher than for heap leach processes.

Two basic methods of gold recovery are normally used to extract the precious metals from the slurry:

- Flotation utilizes surfactant reagents in specially designed, agitated cells, to form a froth to which the gold and/or precious metals bearing sulfide particles attach. This method is generally suited for some ores that contain appreciable quantities of sulfide minerals. Since the Soledad Mountain ores contain few sulfide minerals, it will not be a satisfactory method for use at the project and should be eliminated from consideration on a mineralogical basis.

- Leaching methods utilize cyanide to dissolve gold in large agitated tanks. The precious metals are then recovered from solution using carbon adsorption technology, or sometimes Merrill-Crowe processing, followed by electrowinning of the recovered metals and smelting to produce a doré product.

Due to the need for substantial grinding facilities, the conventional milling process requires considerably greater energy (from five to ten times) than the heap leach process, with its associated impacts of increased fuel consumption and related air quality implications.

The milling process is a larger consumer of water, since the waste products from milling (tailings) are normally disposed of at 35% to 50% water, by weight, after water reclamation, while the heap leaching process will ultimately consume about 12% to 20%, by weight. Thus the milling process could consume up to three times the water required for a heap leach operation.

The tailings also require the construction and maintenance of suitable tailings containment facilities and requires the continuous neutralization of any cyanide that may be contained in them. Because these tailings are stored as a slurry, they cannot be stacked, as in a heap leach, but must be contained in an impoundment. This requires the construction of a much larger storage area, impacting significantly more surface lands. It is estimated that from 325 to 450 acres could be required to store the same amount of tailings from the milling method as opposed to the 245 acres necessary for the proposed heap leach. This additional amount of land, with topographic suitability, is not available at the project site.

At reclamation, the slurried tailings would be dried and revegetated. Due to the fine particle size, this material will be much more susceptible to erosion from wind and water than would be a comparable reclaimed heap leach pile.

The conventional milling alternative has no environmental advantage over the proposed heap leach process that will compensate for the disadvantages discussed above. It should be eliminated from consideration.

#### 2.3.4.3.3 Vat Leaching

The vat leaching process is similar to heap leaching, but is conducted in large, shallow tanks. Ore is prepared in much the same manner as for the heap leach process, except that it is placed in the vats for leaching with dilute cyanide solution, followed by either Merrill-Crowe or carbon adsorption recovery processes. When ore in the vat has been leached, it is rinsed, removed from the vat and disposed of, after which the vat is reloaded and the cycle repeated. It is an appropriate technique to employ with ores having rapid dissolution rates or for sites with insurmountable constraints that prohibit leach pads (e.g. weather or steep topography).

Typically, the precious metals from such ores will be extracted within days or weeks compared to heap leach extraction which can occur over a period of months to years. The same amount of leached ore residue is produced as in heap leaching. However, double-handling of material is required with associated increases in fuel consumption and associated fuel-burning emissions. It may also, in some locations, require the treatment and release of process waters.

This alternative does not present any significant environmental advantages over the proposed method and is not suited for the Soledad Mountain deposit. It should be eliminated from consideration.

#### 2.3.4.3.4 In Situ Leaching

In situ leaching involves the injection of leaching solution directly into an ore body while it is still in place in the ground, and then recovering the enriched solution by pumping from extraction wells. The method requires suitable geologic formations that will confine the solution in the ground until it could be recovered. In the absence of such formations, the potential for adverse effects to groundwater and soils could be substantial.

In situ leaching is typically used for minerals such as salt, borates, copper, uranium and other minerals that are readily dissolved by water or acid solutions as opposed to cyanide leaching solutions typically used to dissolve gold.

While this alternative would not involve open pit mining methods with associated ore and overburden material removal, the risk of solution escape and groundwater and soil contamination will preclude its use for the Soledad Mountain deposit. It should be eliminated from consideration.

#### 2.3.4.4 Alternative Project Location and Configurations

The location of project facilities for the proposed project is largely constrained due to the fixed location of the ore body. The proposed layout has been designed to minimize surface disturbance and energy consumption and to maximize project efficiency in consideration of the given constraints to project development. The facilities and structures proposed for use at the project site are limited to those necessary for efficient operation. Options for relocation of the primary project facilities that were considered but found not to be acceptable are described in the following sections.

##### 2.3.4.4.1 Open Pit Mine

The precious metals ore body location is fixed. Consequently, there are no alternative geographical location options for the open pit mine. This means that an alternate site location for the Soledad Mountain Project is not a viable alternative and should be eliminated from consideration.

##### 2.3.4.4.2 Offsite Ore Processing

The Proposed Action includes onsite location of all facilities required for self-sufficient ore mining and processing including the open pit mine, overburden piles, heap leach pads, gold recovery facilities, maintenance and administration facilities, etc. An offsite

ore processing alternative would consist of extracting ore at the proposed mine site and trucking the ore to a new or existing ore processing facility at an offsite location. For this alternative, the Soledad Mountain Project site would include the open pit mine, overburden piles, an ore stockpile, and ancillary maintenance, administration and truck loading facilities. There would be no need for heap leach pads or gold recovery facilities.

There are two existing facilities in the vicinity that might be capable of processing the ore under contract, however, both have reached full capacity and are in the detoxification/closure stages and will require repermitting to process the Soledad Mountain ore. Furthermore, trucking of ore offsite would require approximately 550 round trips per day (based on 30-ton truck and trailer rigs hauling on a seven day per week schedule). Environmental impacts of this alternative are substantially greater than for the Proposed Action due to increased fuel consumption, increased emissions from truck haulage, and traffic related impacts.

There are no alternative sites nearby that offer substantive environmental advantages and there would still be increased impacts of fuel consumption, dust and fuel burning emissions. Based on these considerations, offsite processing is not a viable alternative and should be eliminated from consideration.

##### 2.3.4.4.3 Heap Leach Pad Alternatives

The Proposed Action is designed to treat ore from the open pit on single-use heap leach pads located near the ore body. It is reasonably foreseeable that up to 60 million tons of ore will be developed for processing. The proposed pad configurations will allow for the treating of this quantity of ore. The heap leach pad capacities and configurations are appropriate to assure that project environmental impacts are adequately assessed.

The proposed location of the heap leach pads were determined after consideration of operational and environmental factors. These include proximity of the open pit mine, efficiency of construction and operation, minimizing land use, and potential for the discovery of additional mineral reserves.

Examination of the layout of the Proposed Action relative to the property boundaries makes it apparent that there are no alternative locations that will provide for the necessary capacity while reducing any environmental impacts associated with the proposed pads. Regardless of the location, the design of any other single heap, or multiple heaps, will result in a similar amount of surface disturbance and visual effect. This alternative should be eliminated from consideration.

#### 2.3.4.4.4 Alternative Solution Storage Configuration

Proposed Configuration

For general reference to the design concept, the term modified valley-fill heap leach can be used to describe a dedicated heap leach pad with internal solution control. The heap leach pads are designed as side hill leach pads with a perimeter dike supporting the toe of each heap. The dike also provides solution storage capacity. One of the most important attributes of the valley-fill concept is the lack of solution ponds exterior to the leach pads. The toe dike will create a pond area for in-heap management of the solutions, runoff from precipitation and retention of the design storm event. The lack of barren and pregnant solution ponds minimizes hazards to wildlife.

All solutions on the pads will be contained inside the heap. Pregnant solution will be extracted by pumps placed in pipes installed on the inside slope of the dike. This prevents liner penetration and associated potential leakage problems. Booster pumps will move the solution to tankage at the process plant. No open ponds are necessary with this arrangement. The pregnant solution will be circulated through the process plant and recirculated to the heap.

Open Solution Storage Ponds

Many heap leach gold mining projects utilize open solution storage ponds for pregnant and barren solution management. These ponds must be designed for the containment of process solution flows, the design storm event, and include additional freeboard for a safety factor allowance. Open solution storage ponds have large surface areas which result in increased water losses due to evaporation and represent a threat to wildlife. Suitable locations for open solution storage ponds are not readily available at the Soledad Mountain Project site.

Because of the increased solution losses, wildlife hazards and lack of available sites, the open solution storage ponds alternative should be eliminated from further consideration as a alternative to the Proposed Action.

#### 2.3.4.5 Alternative Power Supply

Electrical power requirements for the proposed project will be approximately 5,000 kilowatts. The starting and stopping of the large motors and the fluctuating power needs of the crushers will require that the electrical system be able to make rapid responses to avoid unplanned equipment shutdowns or electrical system failures. The problem of this fluctuating load can be dealt with if a sufficient supply of power is made available, such as from a public utility, or by installing onsite generation equipment with a rapid response time to fluctuating load conditions.

Based upon these peak energy and steady load considerations, the following alternatives were considered for power supply to the proposed project:

Utility power from Southern California Edison (SCE)
Onsite power generation/Commercial power consumption

#### 2.3.4.5.1 Proposed Southern California Edison Connection

The closest power lines that are capable of satisfying site power requirements are located at the northeast corner of the project site. A new substation and circuiting equipment will be constructed on the project site with overhead and underground distribution to serve the various locations on the project site.

#### 2.3.4.5.2 On-Site Power Generation/Commerical Power Consumption

Diesel or natural gas fueled power generators could be installed onsite to meet the power requirements of the Proposed Action. Low sulfur diesel fuel could be used for power generation, but operation of these engines may contribute to emissions of carbon monoxide, sulfur oxides and nitrogen oxides. Natural gas fueled generation will reduce emissions in comparison to diesel fueled generators. It is anticipated that sufficient power generation capacity could be designed and constructed such that the environmental impacts would be less than significant in all respects, including noise generation.

Due to the electrical restructuring, opportunities to purchase commercial available power will emerge that the project proponent may wish to pursue at a later date. These options, however, would be developed after the project is developed and the electrical market is better defined. There are commercial quantities of electrical power available in proximity to the project site. Consumption of commercially available power will have identical impacts to those of the proposed project.

# 3.0 AFFECTED ENVIRONMENT, ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

This section examines the effect that the Proposed Action would have upon the environment and conditions that currently exist at the Soledad Mountain project site. It assesses the impacts to mineral resources, physiography and geology, soils, hydrology, air quality, biology, cultural and historical resources, paleontological resources, visual resources, noise, land use, recreation, socioeconomics, health hazards and public safety, and traffic and transportation. For the purpose of this document, an environmental impact is defined as a change in existing conditions that would be affected by the Proposed Action or alternatives.

For each of these resources, consideration is given to: the current environmental setting with respect to the resource; the direct (primary) and indirect (secondary) impacts that the Proposed Action would have on the resource; any irreversible or irretrievable commitment of resources that would result; the contribution towards any cumulative impact that the Proposed Action, in combination with other foreseeable events, would have on the resource; the recommended mitigation measures to be adopted that would reduce any impact to the resource to a less than significant level; and the residual impacts to the resource that would remain following completion of the Proposed Action and implementation of mitigation measures.

This Administrative Draft EIR/EIS utilizes the CEQA guidelines regarding significance of impacts. The CEQA Handbook recommends the use of the following categories when reaching conclusions regarding the significance of impacts. A significant effect on the environment is defined as a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project, including land, air, water, minerals, flora, fauna, ambient noise, and objects of historical or aesthetic significance.

**Less Than Significant**: Results in no substantial adverse change to existing environmental conditions.

**Significant:** Constitutes substantial adverse change to existing environmental conditions that can be mitigated to **Less Than Significant** levels by implementing specified mitigation measures.

**Significant and Unavoidable:** Constitutes substantial adverse change to existing environmental conditions that cannot be fully mitigated by implementing all feasible mitigation measures.

**Beneficial:** Results in a positive change to environmental conditions.

In order to assess the contribution of the Proposed Action to any cumulative impact on the local environment, information regarding anticipated and/or foreseeable projects was sought from the BLM, Kern County Planning, and the Kern County Air Pollution Control District. All agencies indicated that there are currently no anticipated or foreseeable projects for the area that would interact with the Proposed Action for consideration of cumulative impacts. As a result, the analysis of the cumulative effect of the Proposed Action upon the environment is the equivalent of the effect of the Proposed Action upon existing conditions.

### 3.1 Mineral Resources

Setting - Soledad Mountain is a silicic volcanic center consisting of felsic flows, tuffs, and breccias of Middle to Late Miocene age. The rock types include rhyolite, rhyolite porphyry, and quartz latite. Gold was first discovered at Soledad Mountain in 1894. By 1904, three stamp mills were processing ore from the underground veins on the Queen Esther, Karma, Echo, Elephant, and Gray Eagle claims. The Silver Queen vein was discovered in 1933 and a 300 ton per day mill was constructed in 1935 by Gold Fields America, a subsidiary of Gold Fields of South Africa, after consolidating various claims

on Soledad Mountain. It is estimated that over one million tons of ore at grades of approximately 0.23 ounces of gold and 2.5 ounces of silver per ton were mined by underground methods and processed before the War Production Board Order L208 shut the operation down in 1942. During the 1950's, small tonnages of ore were mined by lessees.

In 1985, Golden Queen began acquiring land in order to evaluate the area for an open pit mining operation. Golden Queen now owns or controls a total of 2,840 acres. Of this total, approximately 1,600 acres are part of this Proposed Action, including 1,165 acres of private land and 435 acres of public land administered by the BLM. Proposed disturbance within the 1,600 acre project will be 930 acres, including 735 acres on private land and 195 acres on public land. Approximately 215 acres within the project area have been disturbed by historical mining and mining related activities.

From 1988 through September 1996, 587 drill holes, totaling 194,630 feet, and sampling of 15,611 feet of underground cross cuts were completed by Golden Queen and others. The exploratory effort has resulted in the identification of a potential for up to 60 million tons of ore grade material. Exploration and development drilling is continuing with the expectation that additional mineable reserves will be defined.

The historically mined veins at the site include the Queen Esther, Silver Queen, Golden Queen, Starlight, Gray Eagle, Echo, and Soledad Extension. The veins outcrop in a northwest trending belt approximately 2,000 feet wide and 6,500 feet long. The ore deposits occur as a result of mineralization in a series of epithermal veins, filled faults, and shear zones which vary in width and often exceed 50 feet. The veins are consistent along strike and down dip, some having been mined to a vertical depth of 1,000 feet. The ore deposit contains finely divided free gold as well as silver minerals including cerargyrite and argentite in a gangue of oxidized, brecciated quartz. Pyrite, chalcopyrite, and galena are also present in minor amounts.

No petroleum resources have been discovered to date in the western Mojave Desert. The potential for petroleum resources in the project area is considered extremely low.

The California Department of Conservation, Division of Mines and Geology, has published information regarding geothermal resources in California. No geothermal resources are known to occur in the vicinity of Soledad Mountain.

The California Department of Conservation, Division of Mines and Geology, has developed various reports and other publications which identify lands with aggregate resources. The Division of Mines and Geology has not identified any lands nor developed reports which address aggregate potential in the vicinity of the project site. Reports have been published which identify aggregate resources in the Bakersfield, Kern River, Saugus-Newhall-Palmdale, and San Bernardino County areas.

Direct/Indirect Impacts - Development of the open pit mine will allow access to near surface ores as well as deeper zones of mineralization, which may be amenable to mining using underground mining methods. The development of other mineral resources in the immediate area may be impacted by the placement of overburden piles, the installation of heap leach pads, and the construction of other project facilities. However, the possibility of this occurring is remote since exploration has been conducted in these areas and no economic reserves of precious metals have been noted. The impact to mineral resources in the area is **Beneficial** because the mining and continued exploration will increase the knowledge of the area and the potential for discovery of additional reserves.

The Proposed Action will result in the production of up to 60 million tons of ore material and also the production of construction aggregate from the overburden materials. Commercial utilization of the geologic resources will result in a **Beneficial** impact.

Irreversible/Irretrievable Commitment of Resources - Extraction of the ore represents irreversible development of known precious metals reserves. The precious metals and construction aggregates would be available for use by society.

Cumulative Impacts - There are no foreseeable mineral resource projects in the area. Therefore, there are no cumulative impacts to the mineral resources.

Recommended Mitigation - No mitigation measures are proposed because the project provides a beneficial impact to the mineral resources.

Residual Impacts - The permanent loss of gold reserves is a residual impact which is **Less Than Significant**. The gold will be available for use by society.

## 3.2 Physiography and Geology

### 3.2.1 Topography

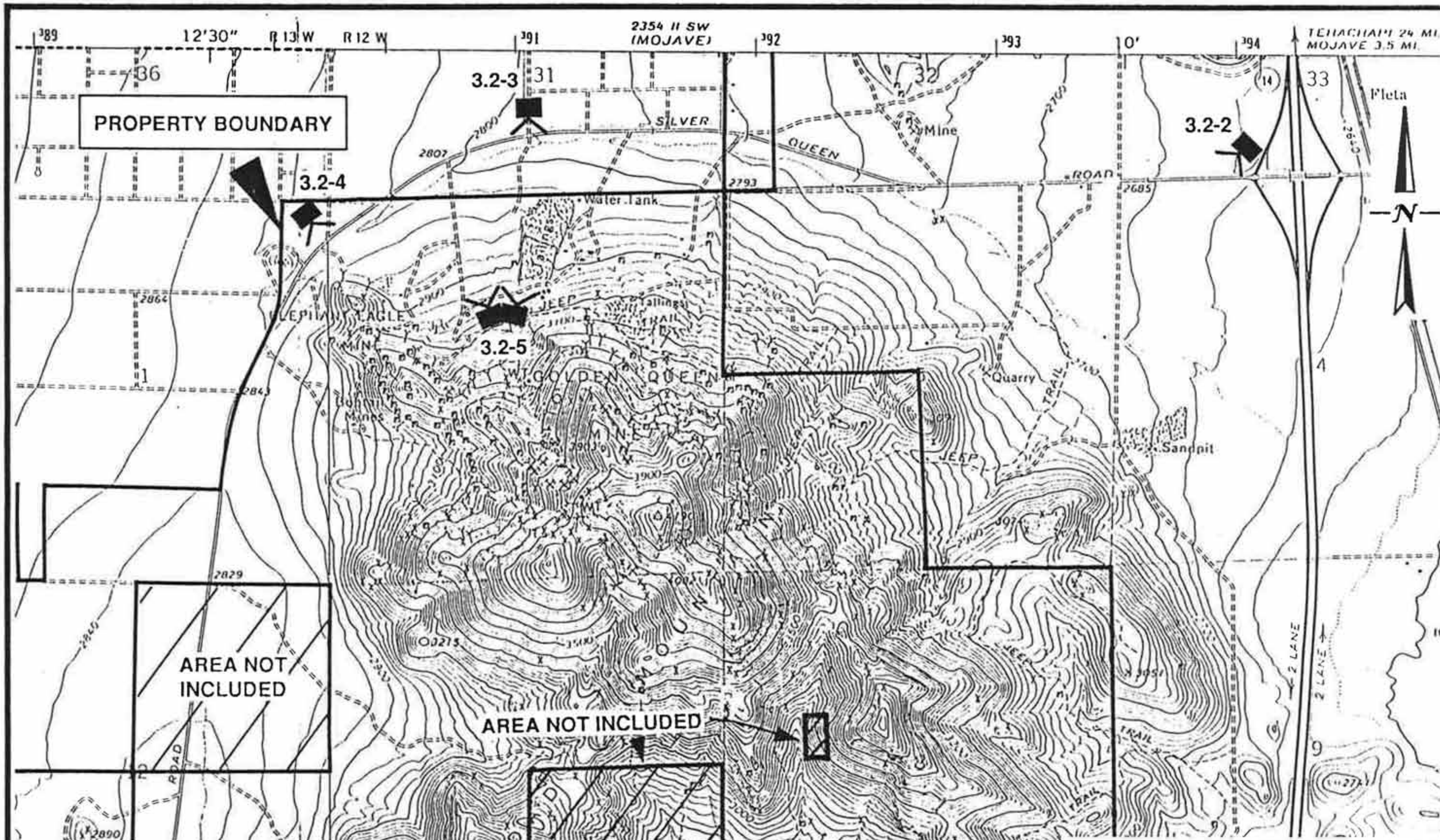
Setting - The topography of the western Mojave Desert in the area of the site varies from relatively flat alluvial areas to steep mountains. Elevations vary from approximately 2,000 feet above mean sea level in the flat alluvial covered areas to over 5,000 feet in some of the mountainous areas. Soledad Mountain, a volcanic peak approximately 3 miles in diameter, is considered a major topographic landmark in this area. The topography of the project area consists of rugged outcrops and ridges with intervening drainages which grade to alluvial slopes and flat areas on the flanks of Soledad Mountain. The elevation of the project area varies from 4,190 feet above mean sea level at the peak of Soledad Mountain to approximately 2,700 feet above mean sea level along the northeast flank.

Photographs which illustrate the topography, current land use, and existing disturbance have been taken from Silver Queen Road looking toward Soledad Mountain and on Soledad Mountain looking out across the surrounding lands. The locations where these

photographs were taken are shown in Exhibit 3.2-1 and are referenced to the following exhibits which present the photographs. Exhibit 3.2-2 is a view of Soledad Mountain taken from the northeast at the intersection of State Route 14 and Silver Queen Road. Exhibit 3.2-3 is a view of Soledad Mountain taken from the north on Silver Queen Road. The pink mill tailings in this photograph are the material which will be salvaged and amended for use in heap leach pad construction. Exhibit 3.2-4 is a view of Soledad Mountain taken from the northwest on Silver Queen Road. Exhibit 3.2-5 shows two panorama views from Soledad Mountain which combine to present the full north-facing view from west to east. The California Portland Cement Company Mojave Plant and Mine are visible at the extreme western edge of the west to north panoramic view, with various wind farms in the central portion of the view and the Camelot Golf Course and housing area due north of the mountain. The north to east panoramic view overlaps the previous view at Camelot and continues eastward showing Mojave, the Mojave Airport, and the existing Billiton Minerals USA Standard Hill Mine. Also shown in the foreground of this view are the remains of the former Gold Fields milling facility.

Surface disturbances which predate the proposed project include the original Gold Fields of South Africa mines as well as other shafts, trenches, tailings, dumps, open stopes, adits, and other facilities associated with the numerous small claims that have historically been worked throughout the project area. Approximately 215 acres of existing surface disturbance are located within the project area.

Direct/Indirect Impacts - The effect to the physiography of the site would be a change in the topography due to the creation of the open pit mine, heap leach piles, and overburden material piles. The impacts of changes in site topography are potentially significant. The changes will be minimized by contouring and revegetation activities as detailed in Appendix VI for the reclamation activities. The mine, overburden material piles, and heap leach piles will constitute permanent landforms after reclamation is complete. The final slope of the open mine pit walls will range from 55 to 63 degrees as referenced in Appendix V. The overburden piles will have overall slopes which will




LEGEND

3.2-2 PHOTOGRAPH LOCATION

AREA NOT INCLUDED

| | | |
|---|---|---|
| WZI INC. BAKERSFIELD, CALIFORNIA | | |
| GOLDEN QUEEN MINING COMPANY INC. Soledad Mountain Project | | |
| PHOTOGRAPH LOCATION MAP | | |
| DATE 11/96 | 0733.0010 | EXHIBIT 3.2-1 |

VIEW FROM NORTHEAST AT THE INTERSECTION OF STATE HIGHWAY 14 AND SILVER QUEEN ROAD

| | | |
|---|---|---|
| WZI INC. BAKERSFIELD, CALIFORNIA | | |
| GOLDEN QUEEN MINING COMPANY INC. Soledad Mountain Project | | |
| VIEW OF PROJECT SITE | | |
| DATE 11/96 | 0733.0010 | EXHIBIT 3.2-2 |

VIEW FROM THE NORTH ON SILVER QUEEN ROAD

| | |
|---|---|
| WZI INC. BAKERSFIELD, CALIFORNIA | |
| GOLDEN QUEEN MINING COMPANY INC. Soledad Mountain Project | |
| VIEW OF PROJECT SITE | |
| DATE 11/96 | 0733.0010 | EXHIBIT 3.2-3 |

VIEW OF PROJECT SITE FROM NORTHWEST ON SILVER QUEEN ROAD

| | |
|---|---|
| WZI INC. BAKERSFIELD, CALIFORNIA | |
| GOLDEN QUEEN MINING COMPANY INC. **Soledad Mountain Project** | |
| VIEW OF PROJECT SITE | |
| DATE 11/96 | 0733.0010 |
| EXHIBIT 3.2-4 | |


PANORAMA WEST TO NORTH

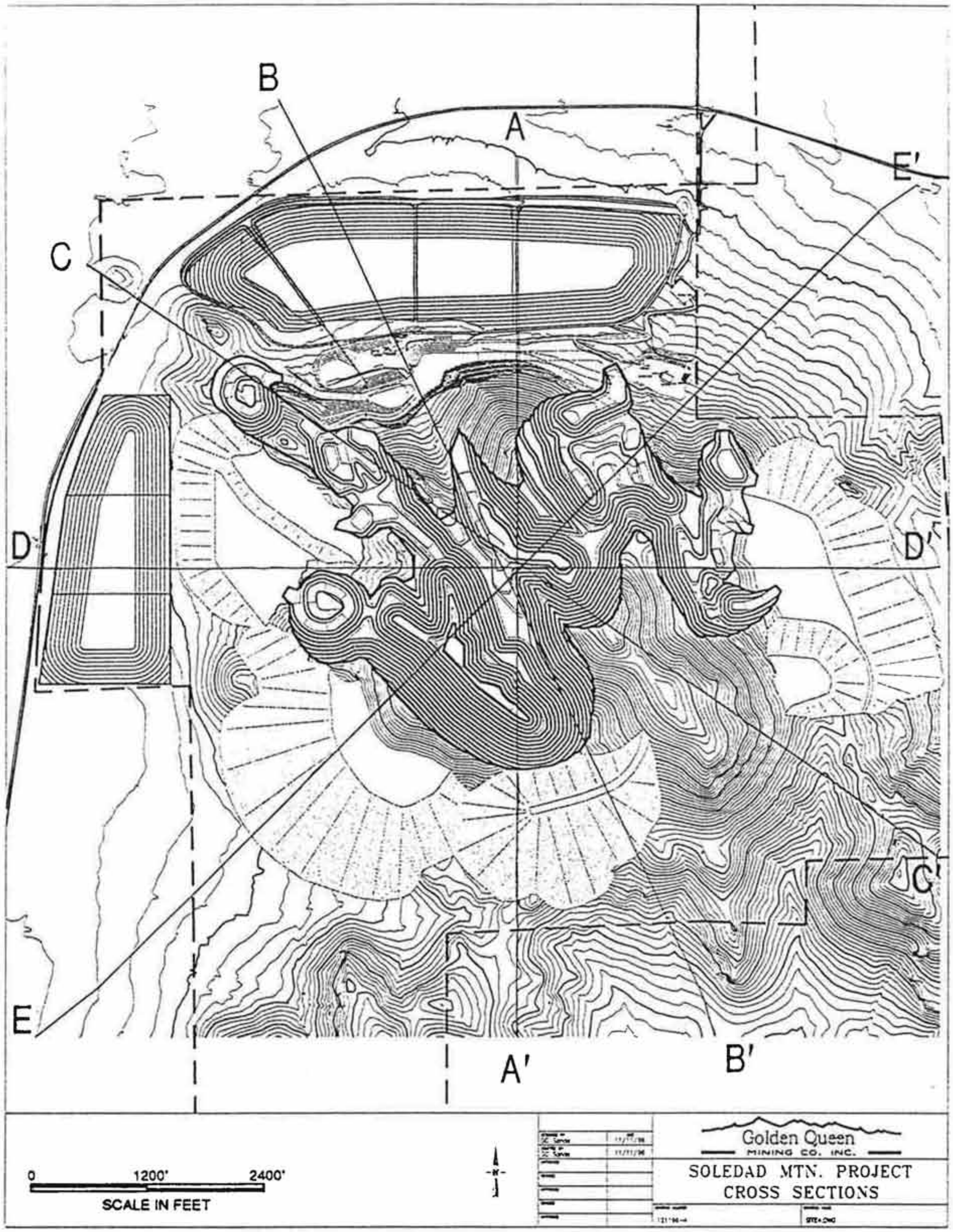

PANORAMA NORTH TO EAST

| | |
|---|---|
| WZI INC. BAKERSFIELD, CALIFORNIA | |
| GOLDEN QUEEN MINING COMPANY INC. Soledad Mountain Project | |
| VIEWS OF SURROUNDING AREA | |
| DATE 11/96 | 0733.0010 | EXHIBIT 3.2-5 |

not exceed 1.8:1.0 (horizontal to vertical). The heap leach piles will have downhill facing overall slopes of 2.5:1.0 (horizontal to vertical) and side slopes of 2.0:1.0 (horizontal to vertical). Topographic profiles were constructed across the site, showing the present topography and topography of the Proposed Action at maximum buildout. The profile locations, the open pit, heap leach piles, and overburden piles are superimposed on the existing topography as shown on Exhibit 3.2-6. The profiles are shown on Exhibits 3.2-7 through 3.2-11.

Cross Section A-A' (Exhibit 3.2-7) is a north south section from Silver Queen Road to the south side of the project area through the heap leach piles, the open pit and the overburden piles. The open pit will not be visible from this view. In order to blend with the surrounding landscape, the outer edges of the tops of the heap leach piles and overburden piles will be rounded and revegetation will be done on the heap leach piles and the horizontal surfaces of the overburden piles. Cross Section B-B' (Exhibit 3.2-8) extends from the northwest to the southeast across the project area. The view will be similar to Cross Section A-A'. Cross Section C-C' (Exhibit 3.2-9) extends from the Silver Queen and Mojave-Tropico Road intersection to the southeast corner of the project area. The open pit will be partially visible from the road. Cross Section D-D' (Exhibit 3.2-10) is an east-west section through the project area, across the western heap leach pile, the open pit, and the eastern overburden pile. The steep walls of the open pit may be partially visible from both the east and the west. The views will be at least partially concealed by the heap leach and overburden piles. Cross Section E-E' (Exhibit 3.2-11) extends from the northeast at Silver Queen Road to the southwest. From this view, the profile of Soledad Mountain will be altered from the rugged mountain slopes to the visible benches of the open pit high wall.

The overall impact to the topography is **Significant and Unavoidable** because the final topography of the open pit will be different from the existing topography and visible. Reclaimed overburden and heap leach piles will blend in with the existing topography.

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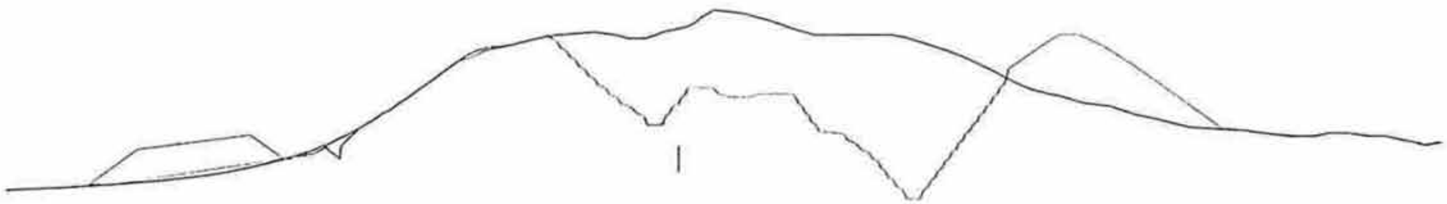
**Soledad Mountain Project**

TOPOGRAPHIC PROFILE
LOCATION MAP

| DATE 11/96 | 0733.0010 | EXHIBIT **3.2-6** |
|---|---|---|

# CROSS SECTION
# A - A'



0 1000' 2000'
SCALE IN FEET

Golden Queen
MINING CO. INC.
CROSS SECTION
A - A'

| | | |
|---|---|---|
| WZI INC.<br>BAKERSFIELD, CALIFORNIA | | |
| **GOLDEN QUEEN MINING COMPANY INC.**<br>**Soledad Mountain Project**<br><br>CROSS SECTION A - A' | | |
| DATE 11/96 | 0733.0010 | EXHIBIT 3.2-7 |

# CROSS SECTION
# B - B'

0 1000' 2000'

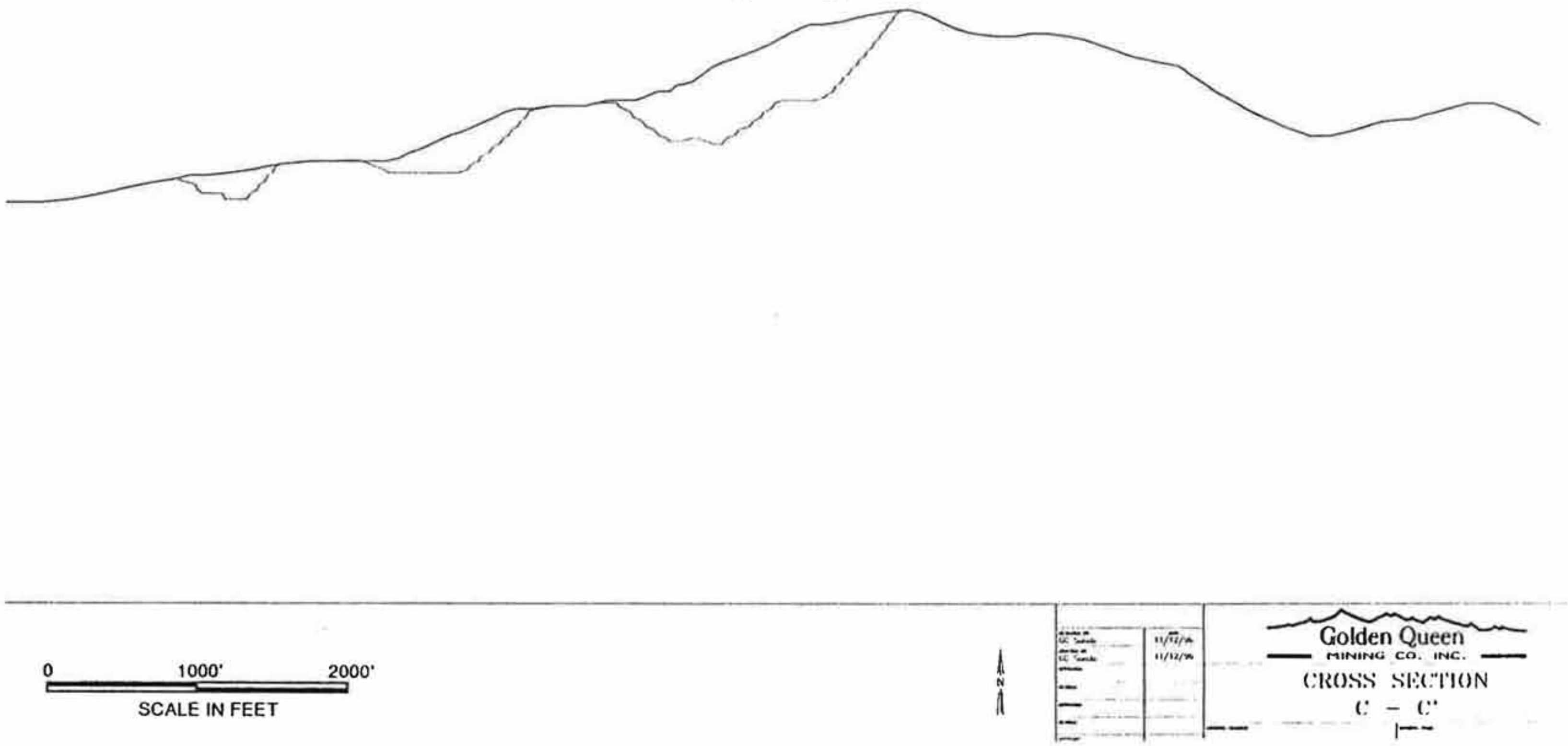
SCALE IN FEET

Golden Queen
MINING CO. INC.

CROSS SECTION
B - B'

| | | |
|---|---|---|
| WZI INC. BAKERSFIELD, CALIFORNIA | | |
| **GOLDEN QUEEN MINING COMPANY INC.** **Soledad Mountain Project** CROSS SECTION B - B' | | |
| DATE 11/96 | 0733.0010 | EXHIBIT 3.2-8 |

# CROSS SECTION
# C - C'

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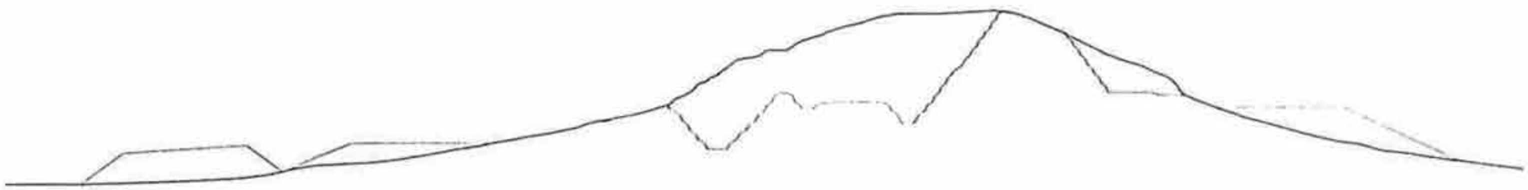
|---|---|
| WZI INC. BAKERSFIELD, CALIFORNIA | |
| GOLDEN QUEEN MINING COMPANY INC. **Soledad Mountain Project** | |
| CROSS SECTION C - C' | |

| DATE | | EXHIBIT |
|---|---|---|
| 11/96 | 0733.0010 | 3.2-9 |

# CROSS SECTION
# D - D'

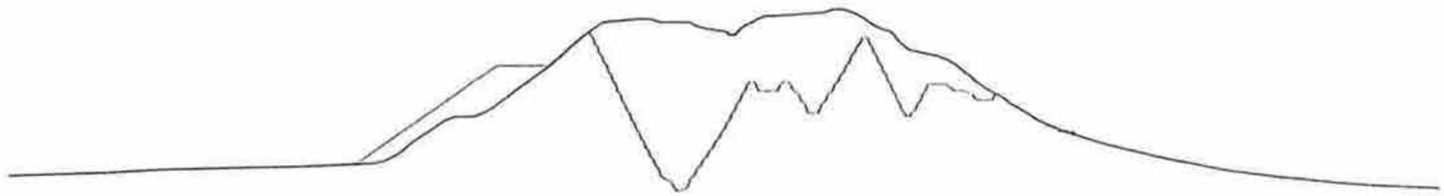


0 1000' 2000'
SCALE IN FEET

Golden Queen
MINING CO. INC.
CROSS SECTION
D - D'

| | | |
|---|---|---|
| WZI INC. BAKERSFIELD, CALIFORNIA | | |
| GOLDEN QUEEN MINING COMPANY INC. Soledad Mountain Project CROSS SECTION D - D' | | |
| DATE 11/96 | 0733.0010 | EXHIBIT 3.2-10 |

# CROSS SECTION
# E - E'



0 1000' 2000'
SCALE IN FEET

Golden Queen
MINING CO. INC.
CROSS SECTION
E - E'

**WZI INC.**
BAKERSFIELD, CALIFORNIA

**GOLDEN QUEEN MINING COMPANY INC.**
**Soledad Mountain Project**

CROSS SECTION E - E'

| DATE 11/96 | 0733.0010 | EXHIBIT 3.2-11 |
| --- | --- | --- |

The reclamation of overburden piles, roads, and tailings from historical mining activity will produce a beneficial impact.

Irreversible/Irretrievable Commitment of Resources - The changes in topography will be permanent and represent an irreversible commitment of resources. The final topography of the overburden and heap leach piles will conform with the surrounding topography using final reclamation procedures as described in Section 2.2.5. The benches of the open pit will be a noticeable feature which is inconsistent with the existing topography. This view will be primarily limited to an area northeast of the site on Silver Queen Road. The view will be partially obscured beyond Silver Queen Road by the topographic feature of Standard Hill which has an elevation of approximately 3,100 feet.

Cumulative Impacts - The cumulative impacts to the topography are the same as the impacts of the Proposed Action, because there are no additional foreseeable projects in the area.

Recommended Mitigation - Reclamation of overburden and heap leach piles will reduce the topographic contrast by rounding the slopes to blend with existing topography.

Residual Impacts - The topography will be permanently changed and the residual impact is **Significant and Unavoidable**.

### 3.2.2 Geology and Seismology

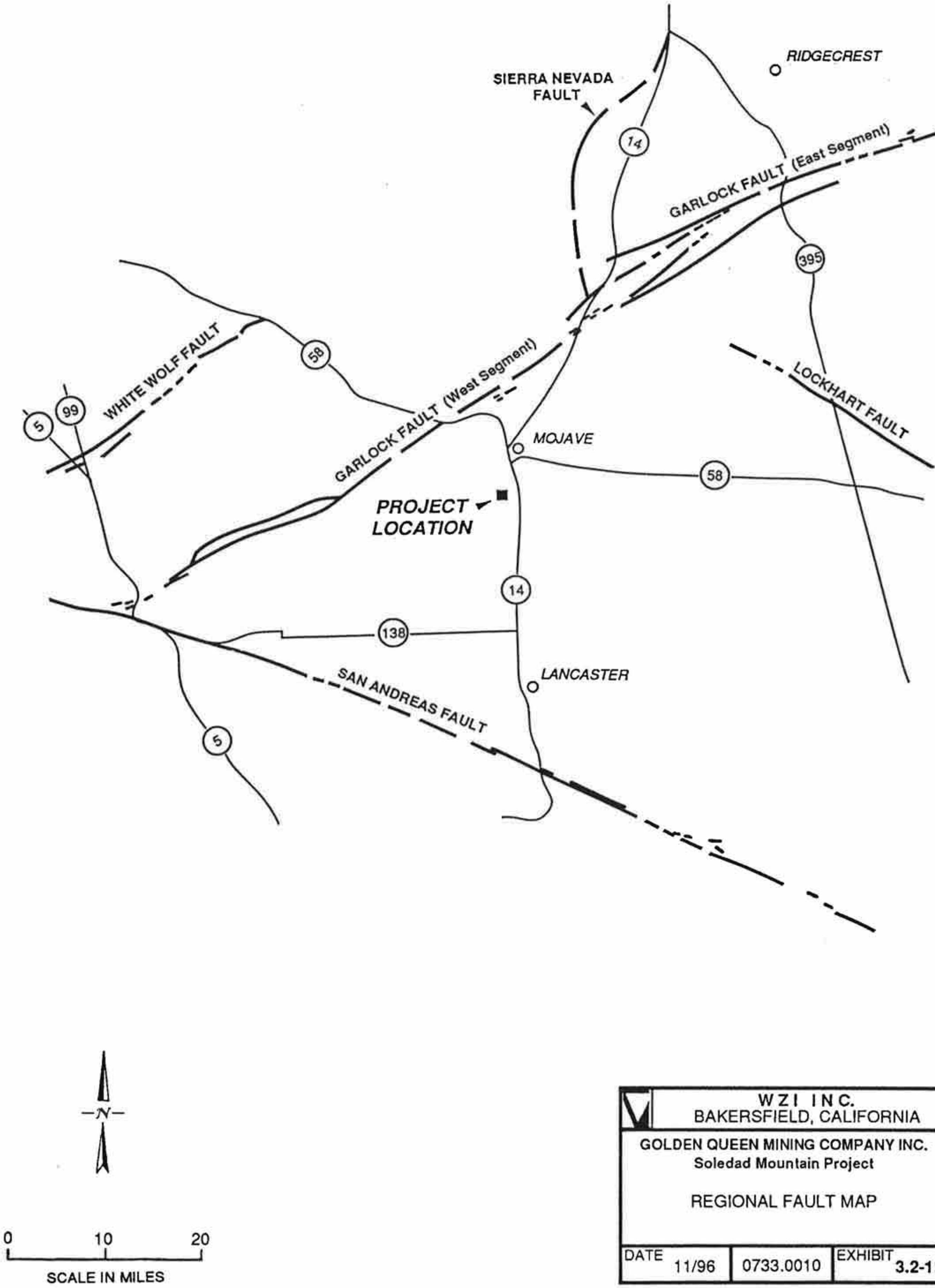
Setting - The site is located in the western Mojave Desert Geomorphic Province of Southern California. The Mojave Desert is a wedge shaped block which is separated from the Sierra Nevada Mountains to the north by the Garlock Fault Zone and from the Transverse Ranges and coastal areas to the southwest by the San Andreas Fault Zone. The rock types of the western Mojave Desert have been grouped into three main divisions (Dibblee, 1967) which include pre-Tertiary age crystalline rocks, Tertiary age sedimentary and volcanic rocks, and Quaternary age sediments and local basalt flows.

Soledad Mountain is an eroded silicic volcanic center of Middle to Late Miocene age (16.9 to 21.5 million years). The volcanics consist of felsic flows, tuffs, and breccias of the Gem Hill Formation with rock types ranging from quartz latite to rhyolite. The flanks of Soledad Mountain are mantled by Quaternary alluvium deposits consisting of sands and gravels.

The site is located in a geologic structurally complex area. The nearest known faults with demonstrated historic movement (during the last 200 years) are the Garlock Fault Zone, located approximately 10 miles to the north, and the San Andreas Fault Zone, located approximately 25 miles to the southwest. Other faults within 35 miles of the site with historic movement include the Sierra Nevada Fault, the Lockhart Fault, and the White Wolf Fault. A regional fault map is shown in Exhibit 3.2-12.

No known faults are present within or adjacent to the project site which demonstrate evidence of Holocene movement (during the last 11,000 years). An unnamed northeast-southwest trending fault zone is located approximately 4 miles to the south of the site in the Rosamond Hills and the Rosamond Fault is located approximately 7 miles south of the site (Jennings, 1992). These faults do not show evidence of Holocene movement. The western end of the Rosamond Fault, also known as the Willow Springs Fault (Dibblee, 1963), and the Cottonwood Fault, west of the project site, show evidence of displacement sometime in the last 1.6 million years (Jennings, 1994). The Randsburg-Mojave Fault, recognized by Duell (1987) but not recognized by Jennings (1994) and the Lahontan Regional Board (Regional Water Quality Control Board - Lahontan Region, 1994), lies northwest of the project site and the Muroc Fault lies northeast of the project site. These two faults are not exposed at the surface and show no evidence of Holocene movement. A local fault map is shown as Exhibit 3.2-13.

All of the major rock types within the project area have been disrupted by faulting with the predominant faults trending north 10 to 40 degrees west and varying in dip from 70 to 90 degrees both east and west near the surface to 45 to 50 degrees at depth. These

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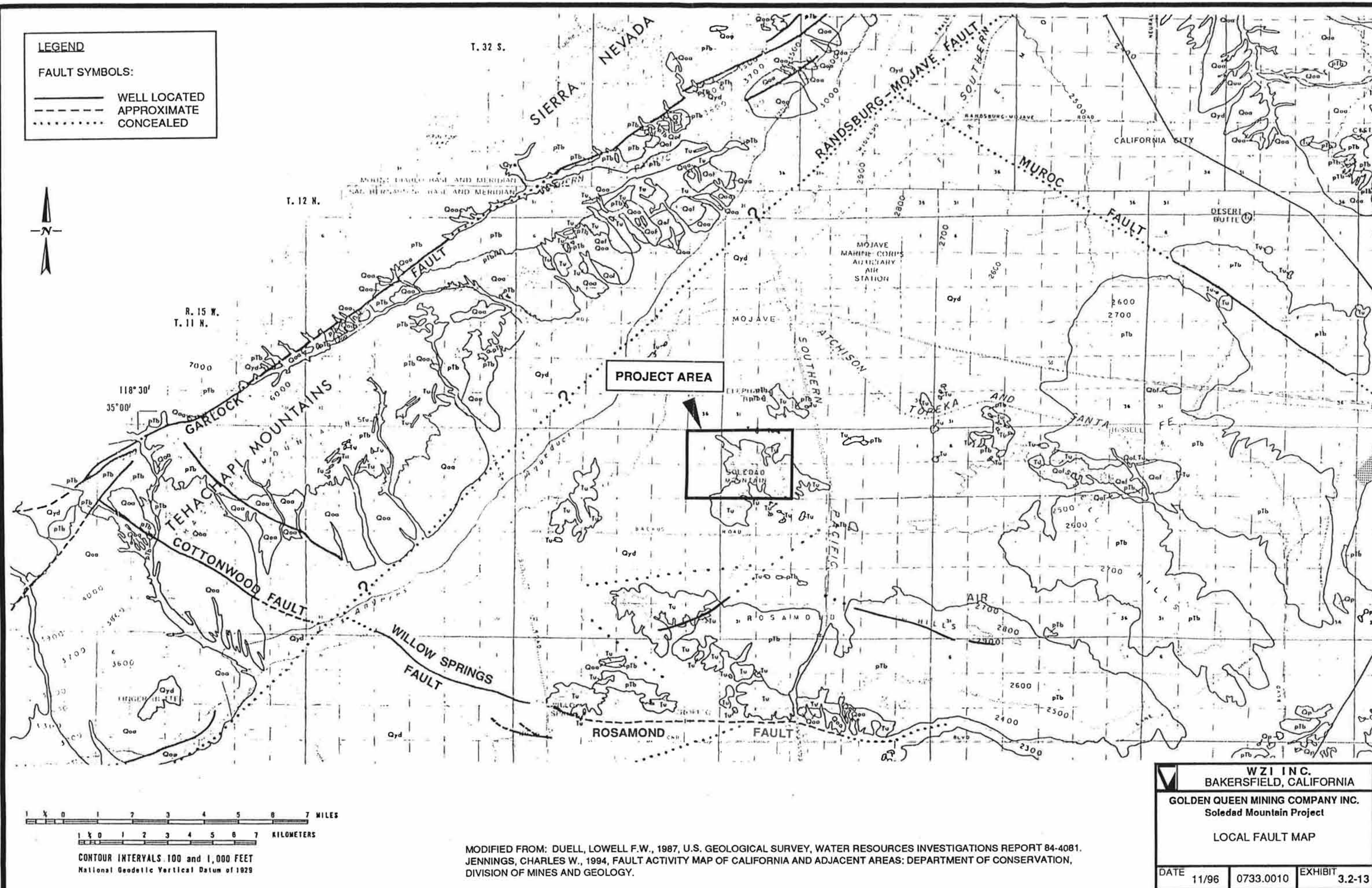
GOLDEN QUEEN MINING COMPANY INC.
Soledad Mountain Project

REGIONAL FAULT MAP

| DATE | | EXHIBIT |
|---|---|---|
| 11/96 | 0733.0010 | 3.2-12 |




MODIFIED FROM: DUELL, LOWELL F.W., 1987, U.S. GEOLOGICAL SURVEY, WATER RESOURCES INVESTIGATIONS REPORT 84-4081.
JENNINGS, CHARLES W., 1994, FAULT ACTIVITY MAP OF CALIFORNIA AND ADJACENT AREAS: DEPARTMENT OF CONSERVATION, DIVISION OF MINES AND GEOLOGY.

| | | |
|---|---|---|
| WZI INC. BAKERSFIELD, CALIFORNIA | | |
| GOLDEN QUEEN MINING COMPANY INC. Soledad Mountain Project | | |
| LOCAL FAULT MAP | | |
| DATE 11/96 | 0733.0010 | EXHIBIT 3.2-13 |

faults are believed to be late Tertiary in age and are postulated to be the primary conduit responsible for the precious metal mineralization which occurs in a series of epithermal veins, filled faults, and shear zones.

According to the Kern County Building Codes, all of Kern County is located within Uniform Building Code Seismic Zone 4. Seismicity at the site is considered to be moderate. The project is not located within an Alquist-Priolo Special Studies Zone, a known active fault zone, or an area designated as a geologic hazard. Table 3.2-1 tabulates the faults nearest the site that have been identified as demonstrating surface displacement within Holocene time (past 11,000 years), their distance from the site, the maximum credible earthquake magnitudes and related ground acceleration, and the maximum probable earthquake magnitudes and related ground accelerations for conditions where the site is underlain by bedrock. Table 3.2-2 tabulates the data for the same faults depicted in Table 3.2-1 but for subsurface conditions that consist of alluvium underneath the site. The maximum credible and probable earthquakes and their related ground accelerations are derived from utilization of the 1996 2.01 version of program, EQFAULT (Blake, 1996).

The nearest fault that causes significant design planning for the Golden Queen Mine is the western segment of the Garlock Fault. The maximum credible earthquake along any particular fault is the largest magnitude earthquake that is possible to occur along that fault. The maximum credible earthquake along the western segment of the Garlock Fault is estimated to be magnitude 7.80. This magnitude earthquake is estimated to produce a peak horizontal ground acceleration of 0.397 gravity at areas where alluvium is present. The same magnitude earthquake would generate peak horizontal ground accelerations of 0.297 gravity at areas where bedrock is present. It is anticipated that at the Golden Queen Mine site in areas where relatively thin alluvium overlies bedrock, the peak horizontal ground acceleration will approximate the value for the bedrock.

**TABLE 3.2-1**

**GROUND RESPONSE FOR BEDROCK SITE CONDITIONS**

| FAULT | DISTANCE FROM SITE (MILES) | MAXIMUM CREDIBLE EARTHQUAKE[1] | MAXIMUM PEAK CREDIBLE GROUND ACCELERATION[2] | MAXIMUM PROBABLE EARTHQUAKE[1] | MAXIMUM PEAK PROBABLE GROUND ACCELERATION[2] |
|---|---|---|---|---|---|
| Garlock (west segment) | 10 | 7.8 | 0.297 | 6.50 | 0.144 |
| Garlock (east segment) | 21 | 7.8 | 0.132 | 6.25 | 0.046 |
| Sierra Nevada | 24 | 7.8 | 0.148 | 6.00 | 0.042 |
| San Andreas | 25 | 8.3 | 0.148 | 8.00 | 0.122 |
| Lockhart | 29 | 7.3 | 0.062 | 5.75 | 0.020 |
| White Wolf | 31 | 7.8 | 0.105 | 6.00 | 0.029 |

**TABLE 3.2-2**

**GROUND RESPONSE FOR ALLUVIUM SITE CONDITIONS**

| FAULT | DISTANCE FROM SITE (MILES) | MAXIMUM CREDIBLE EARTHQUAKE[1] | MAXIMUM PEAK CREDIBLE GROUND ACCELERATION[2] | MAXIMUM PROBABLE EARTHQUAKE[1] | MAXIMUM PEAK PROBABLE GROUND ACCELERATION[2] |
|---|---|---|---|---|---|
| Garlock (west segment) | 10 | 7.8 | 0.397 | 6.50 | 0.192 |
| Garlock (east segment) | 21 | 7.8 | 0.191 | 6.25 | 0.066 |
| Sierra Nevada | 24 | 7.8 | 0.217 | 6.00 | 0.062 |
| San Andreas | 25 | 8.3 | 0.218 | 8.00 | 0.180 |
| Lockhart | 29 | 7.3 | 0.092 | 5.75 | 0.030 |
| White Wolf | 31 | 7.8 | 0.158 | 6.00 | 0.043 |

1 Richter Scale as measured at the epicenter.

2 Measurements in gravity acceleration.

The maximum probable earthquake along any particular fault is the largest magnitude earthquake that is likely to occur during the design life of a specific construction project that is being evaluated for seismic design. The maximum probable earthquake along the western segment of the Garlock Fault is estimated to produce a peak horizontal ground acceleration of 0.192 gravity at the Golden Queen Mine site where alluvium is present. The same magnitude earthquake would generate peak horizontal ground accelerations of 0.144 gravity at areas at the Golden Queen Mine site where bedrock is present. A computer analysis of historic earthquakes that may have subjected the site to ground shaking that occurred from 1800 to 1995 was conducted using the 1996 2.20 version of the program EQSEARCH (Blake, 1996). The estimated maximum horizontal peak site acceleration that affected the site during this time period for alluvial site conditions was determined to have been 0.083 gravity. Due to the nature of the mining project, most features of the project would not be impacted by the ground shaking.

The substrate at the project site does not consist of material that is subject to liquefaction. There is no evidence of static hazards, such as landsliding. There are old underground mining areas, open to or near the ground surface, in the project area with an attendant risk of collapse or subsidence.

Direct/Indirect Impacts - The site could be subject to significant ground shaking due to the earthquakes along identified potentially active faults. Project construction design, due to seismic hazards at the site, will be in accordance with Zone 4 seismic design provisions of the Uniform Building Code. Earthwork and fills will be constructed in accordance with geotechnical design specifications. Structures will not be located on unstable areas or slopes greater than allowable under the Building Code.

A slope stability analysis has determined the maximum allowable slope for mine walls. Analyses of maximum allowable slopes for the heap leach piles and the overburden piles have been conducted to prevent failure during a reasonably foreseeable seismic event.

An emergency response plan and training program will be developed which addresses seismic emergencies. Due to the seismic project design features and the nature of open pit mining, the seismic hazards are considered **Less Than Significant**.

Old underground mining areas will be excavated or remediated as part of the project operation. The removal of the attendant risk from collapse of the historical mine workings during a seismic event is a **Beneficial** impact.

Irreversible/Irretrievable Commitment of Resources - There is no irreversible/irretrievable commitment of geologic resources.

Cumulative Impacts - There are no cumulative seismic impacts associated with this project.

Recommended Mitigation - The impact of the project due to seismic hazards is less than significant and no mitigation measures are proposed.

Residual Impacts - There are no significant residual seismic hazard impacts associated with this project.

## 3.3 Soils

Setting - A soil inventory was conducted for P. M. DeDycker and Associates between August, 1989 and May, 1990 and in May, 1995 by Bamberg and Hanne. The inventory (included in Appendix VII) identified four soil types in the area on and around Soledad Mountain, the characteristics of the soil types, and the suitability of the soil and substrate material for reclamation. The four soil types are summarized as follows:

Arizo (104) - A sandy loam with 40% gravel and small stones grading to 50% stones and cobbles with depth. The soil is loose and friable with good permeability and high wind erosion potential. Soil salvage is limited by coarse fragments, texture, and nutrient

status. Arizo soil is generally located on alluvial toe slopes and fans around the base of Soledad Mountain.

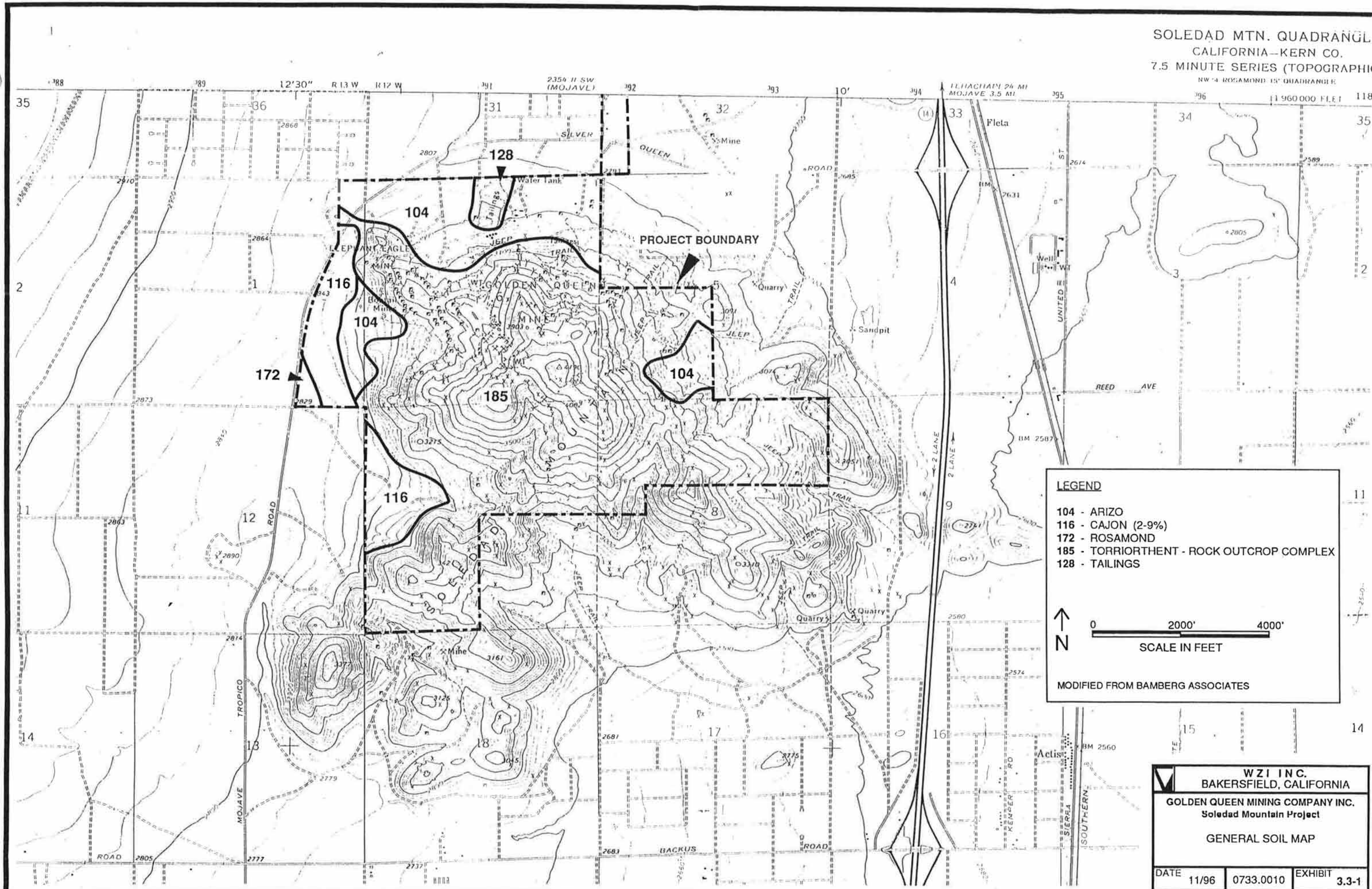
Cajon (114, 116) - A light brown to brown, loose friable, gravelly loamy to loamy sand with fine roots containing 15% gravel. Gravel content decreases with depth. The soil permeability is very good, wind erosion potential is very high, and salvage is limited due to coarse fragments. Cajon soils are located on alluvial fans and plains with 0 to 4% slopes to the west and south of the base of Soledad Mountain.

Rosamond (172) - A reddish to light brown, sandy loam to gravelly sandy loam with moderately slow permeability and high erosion potential. The soil contains 10% gravel and is located on the flat areas to the west of Soledad Mountain with slopes of 0 to 2%.

Torriorthents (185) - Weathered rock outcrop and shallow to deep residual soils from host rock on the mountain which are not of any one classification series. Soils consist of clay loam to cobbly, loamy sand with up to 60 to 70% rocks and cobbles, with permeabilities ranging from moderately slow to moderately rapid, and moderate erosion potential.

Soils on and around Soledad Mountain have been mapped by the United States Soil Conservation Service (SCS, 1981). A general soil map of the site by Bamberg Associates is included as Exhibit 3.3-1. The numbers attached to the soil types above are used on the general soil map to indicate the location of each soil.

In spite of steep slopes on the mountain, there is minimal evidence of slope or soil instability in the form of slides, soil creep, or solifluction lobes. None of the soils contain enough clay to be subject to shrinking or swelling.


SOLEDAD MTN. QUADRANGL
CALIFORNIA–KERN CO.
7.5 MINUTE SERIES (TOPOGRAPHI(
PROJECT BOUNDARY
104
116
172
185
128
Tailings
Water Tank
GOLDEN QUEEN MINE
Quarry
Sandpit
Mine
Fleta
REED AVE
TROPICO ROAD
MOJAVE
BACKUS ROAD
Actis
LEGEND
104 - ARIZO
116 - CAJON (2-9%)
172 - ROSAMOND
185 - TORRIORTHENT - ROCK OUTCROP COMPLEX
128 - TAILINGS
N
0
2000'
4000'
SCALE IN FEET
MODIFIED FROM BAMBERG ASSOCIATES
WZI INC.
BAKERSFIELD, CALIFORNIA
GOLDEN QUEEN MINING COMPANY INC.
Soledad Mountain Project
GENERAL SOIL MAP
DATE 11/96
0733.0010
EXHIBIT 3.3-1

Arizo soil is located in the area of the proposed heap leach pad and other facilities on the north side of the mountain. Construction in this area will result in the disturbance of approximately 140 acres mantled by Arizo type soils and 95 acres covered by Torriorthents.

The top six inches of Arizo soil is referred to as growth media in the Reclamation Plan and Revegetation Procedures prepared by Bamberg Associates (Appendix VI) because of its seed content not because of any superior ability to support growth. The Torriorthents soil is composed of greater than 50% rocks and cobbles and is therefore not subject to salvage according to SMARA.

The heap leach pad proposed for the west side of the project area will lie in an area covered by Arizo, Cajon and Rosamond soils. Construction of the western heap leach pad will disturb approximately 80 acres of soil. The Arizo and Cajon soils from this area will also act as growth media and will be removed and stockpiled for use during reclamation.

The proposed open pit mine and overburden piles are to be located in areas covered by Arizo soil and Torriorthents. Approximately 555 acres of Torriorthents soil and 40 acres of Arizo soil will be disturbed.

Direct/Indirect Impacts - Up to 6 inches of Arizo and Cajon type soils (approximately 200,000 cubic yards) will be removed from the heap leach pad areas and stockpiled as growth media for use in reclamation and revegetation. However, Bamberg Associates describes successful revegetation of overburden materials and heap leach materials without application of growth media (Appendix VI). Because soils will be salvaged to the extent practical and soils present in the area are rocky and nutrient poor, the impacts to soils are **Less Than Significant**.

Soil impacts will be limited by keeping surface disturbance to a minimum necessary to construct and operate the project, and best management practices will be observed during construction to minimize or eliminate unnecessary disturbance such as vehicle travel outside construction areas, creation of new roads, etc. A Site Grading Plan will be prepared in accordance with Kern County regulations which will include provisions for erosion control and sedimentation ponds to serve as catchments for storm water runoff. Therefore, impacts to soils are **Less Than Significant**.

Irreversible/Irretrievable Commitment of Resources - The loss of soil over approximately 910 acres, except for the estimated 200,000 cubic yards salvaged for use as growth medium, is an irretrievable commitment of soil resources.

Cumulative Impacts - There are no cumulative impacts to soils related to the project.

Recommended Mitigation - No mitigation measures are proposed because impacts to soils are less than significant.

Residual Impacts - The permanent loss of soil is considered **Less Than Significant**.

## 3.4 Hydrology

### 3.4.1 Surface Water

Setting - The site is located in the northern portion of the Antelope Valley just south of the Fremont Valley. The average annual rainfall at the site is approximately 6.14 inches. Surface drainage at the project location is greatly influenced by the site topography which varies from steep, rugged hillsides on the upper elevations of Soledad Mountain to a gently sloping desert floor on the flanks. Drainage in the project area on the north side of Soledad Mountain is through a series of deeply incised gullies and channels which are primarily fed by precipitation from winter storms and infrequent summer thunderstorms. Runoff from the project area is channeled to the north, northwest, and

northeast of Soledad Mountain, eventually draining north and east to the Gloster and Chaffee Hydrologic Areas of the Antelope Hydrologic Unit (Regional Water Quality Control Board -Lahontan Region, 1994).

The proposed project area is not located in a 100-year flood plain based on a map by the Federal Emergency Management Agency. The nearest 100-year flood plain lies along Silver Queen Road one quarter mile northeast of the proposed heap leach pad. Silver Queen Road, northeast and east of the project site, is designated zone A, defined as an area of 100-year flood where the base flood elevations and flood hazard factors have not been determined.

The project area does not contain any surface waters including springs, seeps or intermittent streams. The nearest intermittent stream is located approximately three miles west of the project site. Oak Creek, an intermittent stream which is one of the primary sources of recharge in the area, is located approximately five miles west of the project site. All precipitation which does not evaporate will percolate into the Antelope Valley groundwater (the designated receiving water). It is estimated that approximately 5% of the precipitation in the groundwater basin reaches the groundwater. The majority is taken up by natural processes such as evapotranspiration (Duell, 1987). No site specific information on water quality surface flow is available.

Surface water beneficial uses identified within the greater Antelope Hydrologic Unit area include municipal, agricultural, groundwater recharge, water contact recreation, non-contact recreation, warm freshwater habitat, and wildlife habitat (Regional Water Quality Control Board - Lahontan Region, 1994). Minor wetlands have been reported well outside the project area with similar beneficial uses.

As a result of the proposed project, overburden materials will be removed from the open pit mine and deposited in piles in the project area. Studies have been conducted to determine the acid generation potential of the overburden materials in order to evaluate their potential effect on the surface water and groundwater in the area. To evaluate the

acid generation potential of the overburden materials, a total of eleven samples of the rock types present at the site were collected and tested to determine the acid generation potential. The laboratory analyses of the eleven samples and calculations are presented in Table 3.4-1.

The acid generation/neutralization potential for the samples was evaluated by two methods. By the first method, the net generation/neutralization potential is determined by the difference between the neutralization potential and the true acid generating potential based on sulfide content ($NP\text{-}AP_{sulfide}$). The results of this method are presented in Column 10 of Table 3.4-1. According to this method, the samples have net neutralization potentials which range from 0.7 to 5.0 tons calcium carbonate equivalent per 1,000 tons of rock and an average net neutralization potential of 2.6 tons calcium carbonate per 1,000 tons of rock. The pH of the saturated paste for the samples ranges from 4.85 to 8.33 and averages 6.74 (Column 7, Table 3.4-1).

According to Environmental Protection Agency document number EPA-600/2-78-054 (Sobek et al, 1978), a rock material is considered potentially toxic if it has a net neutralization potential deficiency (acid generating potential) of 5.0 tons of calcium carbonate equivalent or more per 1,000 tons of material and acid-toxic if the pH of the pulverized rock slurry is less than 4.0 (Column 7, Table 3.4-1). None of the samples showed a net neutralization potential deficiency. The net acid-base account for the samples tested indicates that all of the samples had net neutralization potentials ranging from 0.7 to 5.0 tons of calcium carbonate equivalent per 1,000 tons of rock (Column 10, Table 3.4-1) and pH values greater than 4.0 (Column 7, Table 3.4-1). Consequently, none of the samples evaluated by this method would be considered potentially toxic by acid generating potential or acid-toxic by pH level.

# TABLE 3.4-1

## ACID GENERATION/NEUTRALIZATION POTENTIAL

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|
| SAMPLE # | ROCK TYPE | DATE COLLECTED | NEUTRALIZATION POTENTIAL TONS/1000T | ACID GENERATION POTENTIAL TONS/1000T | ACID GENERATING POTENTIAL SULFIDE TONS/1000T | PH-SATURATED PASTE | NP/AP | NP/AP $_{SULFIDE}$ | NET NEUTRALIZATION POTENTIAL NP-AP $_{SULFIDE}$ |
| GQ/AB-1 | Quartz Latite | 9/18/95 | 2.9 | 1.1 | <0.1 | 7.12 | 2.63 | 29 | 2.8 |
| GQ/AB-2 | Pyroclastic | 9/18/95 | 3.9 | 3.4 | 0.4 | 6.42 | 1.15 | 9.75 | 3.5 |
| GQ/AB-3 | Quartz Latite | 9/18/95 | 5.1 | 1.6 | <0.1 | 7.22 | 3.19 | 51 | 5.0 |
| GQ/AB-4 | Pyroclastic | 9/18/95 | 2.2 | 11.6 | 1.2 | 5.37 | 2.20 | 1.8 | 1.0 |
| GQ/AB-5 | Rhyolite | 9/18/95 | 3.7 | 0.3 | <0.1 | 8.33 | 12.33 | 37 | 3.6 |
| GQ/AB-6 | Quartz Latite | 9/18/95 | 2.6 | 2.9 | 0.1 | 7.44 | 0.90 | 26 | 2.5 |
| GQ/AB-7 | Rhyolite | 9/18/95 | 4.7 | 11.2 | 1.2 | 6.48 | 0.42 | 3.9 | 3.5 |
| GQ/AB-8 | Pyroclastic | 9/18/95 | 3.0 | 1.2 | <0.1 | 6.73 | 2.5 | 30 | 2.9 |
| GQ/AB-9 | Pyroclastic | 9/18/95 | 0.9 | 12.9 | 0.2 | 6.99 | 0.07 | 4.5 | 0.7 |
| GQ/AB-10 | Rhyolite Porphyry | 9/18/95 | <1 | 140 | 0.2 | 4.85 | <.007 | 5.0 | 0.8 |
| GQ/AB-11 | Rhyolite | 9/18/95 | 2.2 | 0.9 | <0.1 | 7.20 | 2.44 | 22 | 2.1 |
| AVERAGE | | | 2.9 | 17.0 | 0.3 | 6.74 | 2.53 | 20.0 | 2.6 |

A second method for evaluating acid generation/neutralization potential has been proposed by Smith and Barton-Bridges (1991) and is summarized in Mine Waste Management (Hutchinson and Ellison, 1992). In this approach, the ratio of neutralization potential to acid potential (NP/AP) is calculated in three stages starting with a screening stage and progressing to more detailed analyses in Stages 2 and 3. The NP/AP ratio in Stage 1 utilizes the total sulfur acid potential and the rock is considered non-acid generating if the ratio (NP/AP) is greater than 3. The NP/AP ratios utilized for the Stage 1 analyses are presented in Column 8 of Table 3.4-1. Only two of the analyzed samples, GQ/AB-3 and GQ/AB-5, are considered non-acid generating by the Stage 1 criteria. In Stage 2, the NP/AP ratio is determined utilizing the sulfide sulfur acid potential and the rock is considered non-acid generating if the $NP/AP_{sulfide}$ ratio is greater than 3. The Stage 2 $NP/AP_{sulfide}$ ratios are presented in Column 9 of Table 3.4-1. All of the samples analyzed contained $NP/AP_{sulfide}$ (Stage 2) ratios in excess of 3.0 with the exception of sample GQ/AB-4. The average $NP/AP_{sulfide}$ ratio for all of the samples is 20.0. Sample GQ/AB-4 represents approximately 10% of the total overburden material. During normal mining operations ore and overburden will be concurrently excavated at multiple open pit mining areas and the overburden materials will be transported to multiple sites. As a result, all of the various rock types will be dispersed and widely distributed among the various overburden piles which will prevent concentrating the rock type represented by sample GQ/AB-4 in any one area. This dispersion of various rock types, in conjunction with the low annual rainfall (6.14 in/yr) and high evaporation rate (116 in/yr) will minimize the potential for formation of leachate in the overburden piles.

Direct/Indirect Impacts - A project will normally have a significant effect on the environment if implementation of the project would result in the degradation of groundwater quality, degradation or depletion of groundwater resources, interference with groundwater recharge, or exposure of people or property to substantial flooding. Water quality standards and safety standards are set by the State Water Resources Control Board or Regional Water Quality Control Board and by the Federal Emergency Management Agency (FEMA) and County Ordinances.

Immediately north of the project site, where the basement rock plunges below the alluvium, the groundwater table is at a depth of 180 feet below the surface. The project is designed as a zero discharge facility as described in Section 2.2.2. No bodies of surface water are located near the site and the site is not in a flood plain, all of which combine to minimize the potential for surface water contamination.

No direct or indirect wastewater discharges will result in acute or eventual exposures to hazardous materials in quantities which would adversely affect human health, wildlife, or plant species. Based on the evaluations of the acid generation/neutralization potential and pH data for the representative samples, the acid generating potential is considered to be minimal for the representative samples which were analyzed, and the impact of piling overburden materials on the surface of the ground will be **Less Than Significant**.

The Proposed Action will comply with all applicable regulations relating to hydrology and water quality. The Lahontan Regional Board will regulate project systems with the potential to discharge liquids to surface or subsurface waters. The review and permitting process will follow requirements of Title 23 CCR, Chapter 15, Article 7 (Mining Waste Management), the California Health and Safety Code, Chapter 6.67 (Above Ground Storage of Petroleum), the California Porter-Cologne Water Quality Act of 1985, and other applicable laws and regulations as described in Sections 1.6.3 of this document.

Project design features and regulatory requirements relating to hydrology and water quality are discussed in Section 2.0. As a result of these regulatory requirements and design and construction considerations, the impacts to surface water resulting from the Proposed Action will be **Less Than Significant**.

<u>Irreversible/Irretrievable Commitment of Resources</u> - The surface drainage pattern will be permanently altered. However, the Site Grading Plan, which will be approved by Kern County and will fulfill the SMARA requirements for stabilization of drainages and erosion control, will assure that the new drainage pattern will not cause flooding, will prevent undue erosion and unnatural surface runoff and will allow for percolation of

storm water for normal recharge of the groundwater. Compliance with Waste Discharge Requirements will provide protection of surface water and groundwater quality. Therefore, the impact is **Less Than Significant**.

Cumulative Impacts - There are no cumulative impacts to surface hydrology as the result of this project.

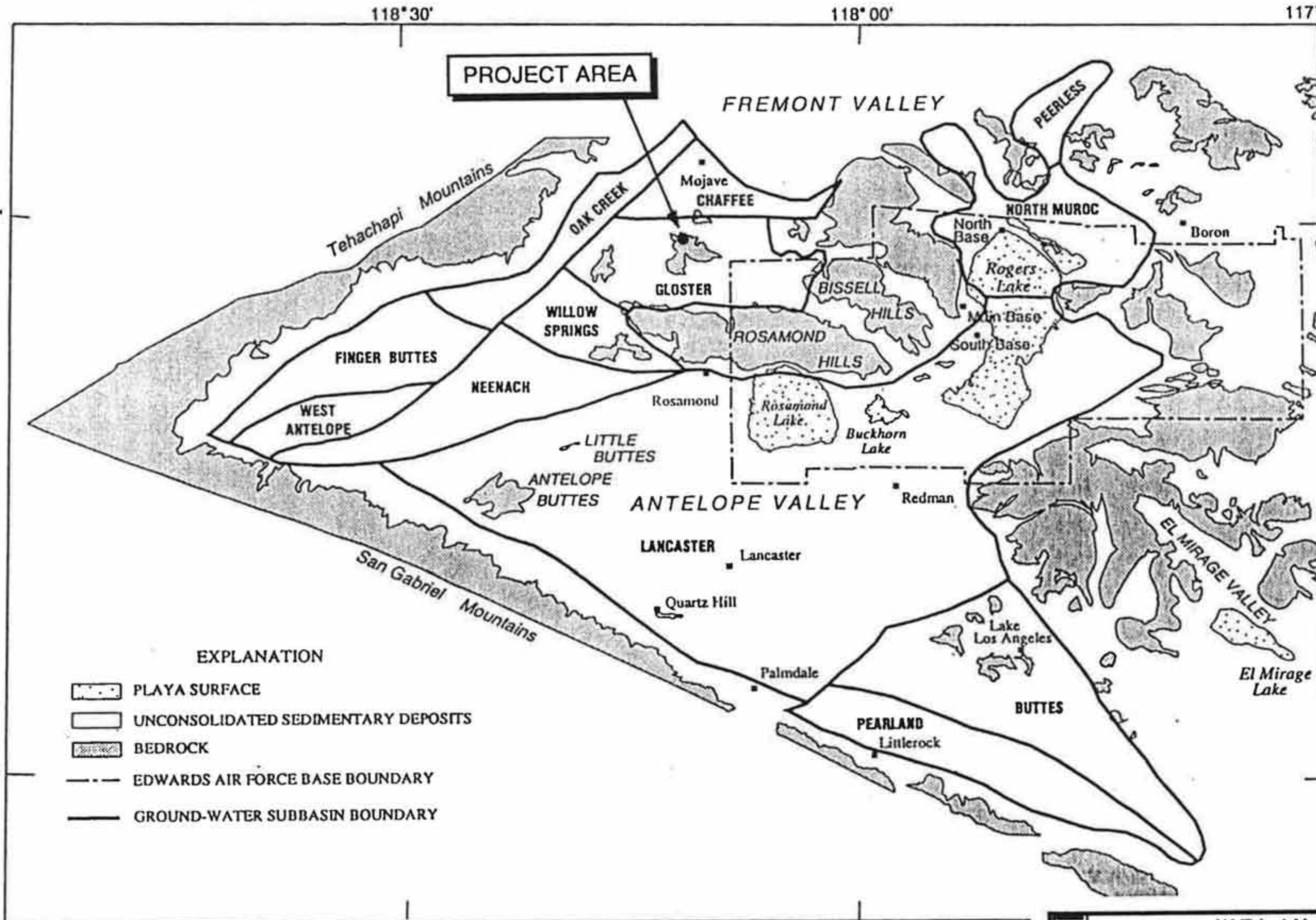
Recommended Mitigation - The impacts to surface water as a result of the proposed project are less than significant and no mitigation measures are proposed.

Residual Impacts - There will be no residual impacts.

### 3.4.2 Groundwater/Water Supply

Setting - According to recent published reports, the project site is located in the northern area of the greater Antelope Valley Groundwater Basin in the Chaffee subunit (Regional Water Quality Control Board - Lahontan Region, 1994) or in the Gloster subunit (Duell, 1987) as shown in Exhibit 3.4-1. Earlier work places the project site in the Gloster and Chaffee subunits in the Fremont Valley Groundwater Basin which is located immediately north of the Antelope Valley (Bloyd, 1967). The Gloster subunit is separated from the remainder of the Antelope Valley Groundwater Basin by the Rosamond Hills except in an area west of Willow Springs (Bloyd, 1967).

Groundwater recharge is primarily from the Tehachapi Mountains via intermittent streams such as Cache Creek and Oak Creek. Bloyd calculated the recharge to the Fremont Valley, including the Gloster and Chaffee subunits, as approximately 18,000 acre feet per year. Hydrographs of water wells located in the vicinity of Soledad Mountain indicate that the groundwater table has been relatively stable over the last 16 years, lowering at the rate of approximately one quarter to one half foot per year. Some of this change can be related to wet vs dry periods of rainfall with a flattening or slight recovery during wet periods and a steeper drop during drought conditions. Exhibit 3.4-2 shows rainfall totals




Ground-water subbasins in Antelope Valley (from Bloyd, 1967).

| | |
|---|---|
| WZI INC. BAKERSFIELD, CALIFORNIA | |
| GOLDEN QUEEN MINING COMPANY INC. Soledad Mountain Project | |
| REGIONAL GROUNDWATER BASINS | |
| DATE 11/96 | 0733.0010 |
| EXHIBIT | 3.4-1 |

# RAINFALL DATA, MOJAVE STATION NO. 45756

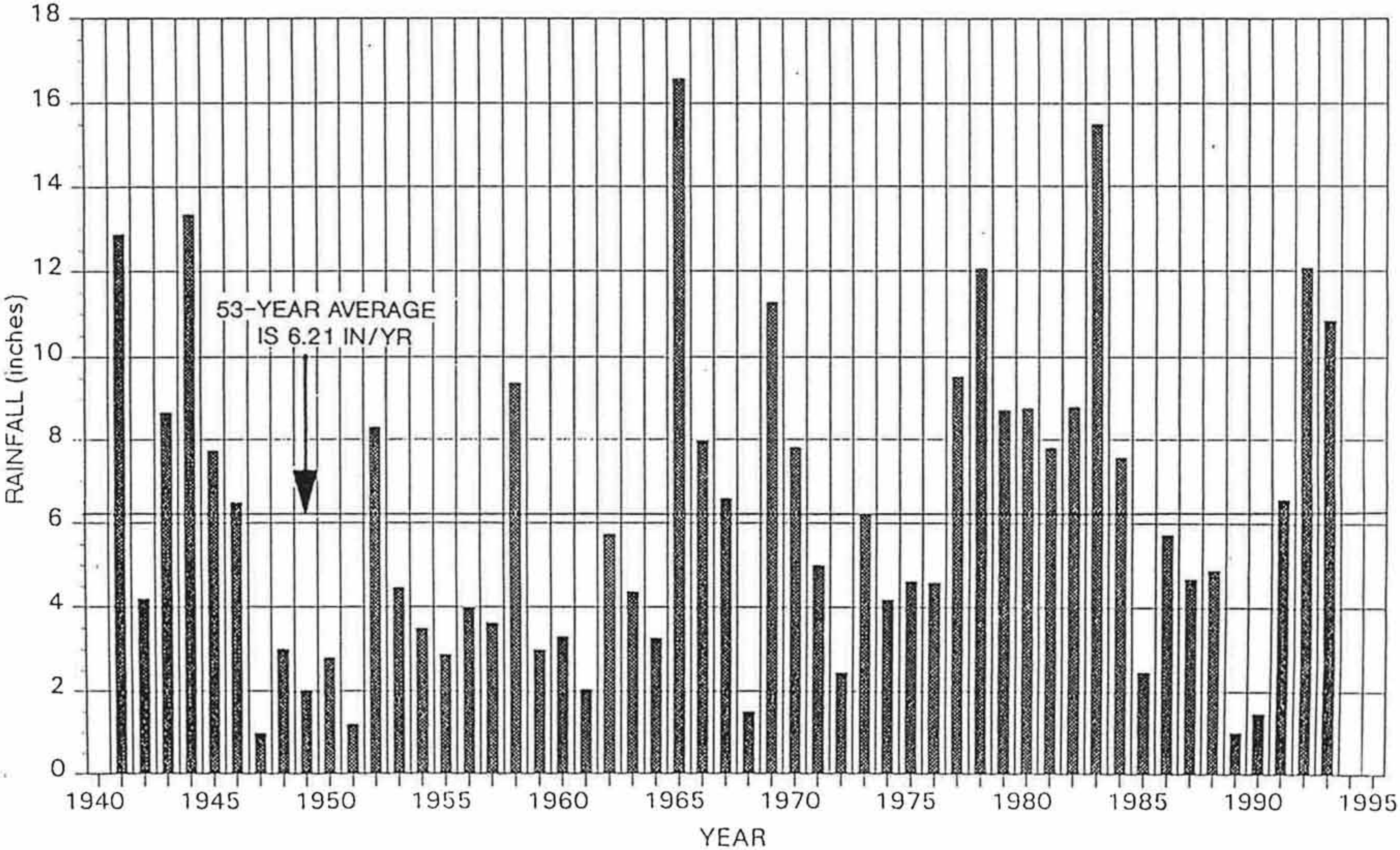



**EXHIBIT 3.4-2**
0733.0010

in the vicinity of Mojave and Exhibit 3.4-3 shows a hydrograph for a well located 5 miles east-southeast of the project area in the same groundwater subunit.

Slade (1994) calculated a perennial yield for the Chaffee subunit of approximately 300 acre feet/year over the period from 1970 through 1990. Perennial yield is the quantity of groundwater that can be pumped annually without any change in groundwater levels or net change in groundwater storage during the base period. This calculation considers existing groundwater withdrawal. There have been no significant changes in the groundwater basin since 1990.

The primary aquifer in the area is the alluvium which fills the areas between bedrock outcrops. The alluvial aquifer is generally poorly consolidated to unconsolidated and composed of silt, sand, gravel, and boulders, as described in the Hydrology Study Summary for the Soledad Mountain Project (Appendix VIII). Limited amounts of groundwater may occur in the fractured crystalline and volcanic bedrock that forms Soledad Mountain although groundwater has not been noted in the exploration boreholes or the mine shafts. Known water wells in the vicinity of the project are shown in Exhibit 3.4-4. The groundwater gradient is generally from west to east, with local southwest components in the vicinity of the project site as shown on the groundwater elevation map constructed from 1990 groundwater data (Exhibit 3.4-5).

Groundwater users in the Gloster and Chaffee subunits include California Portland Cement Company, Cactus Gold Mines Company, Mojave Public Utility District, and individual residences. The Cactus Gold Mines facility is scheduled to close in the near future and will discontinue use of groundwater from the area basin. Very little water is used in the area for crop irrigation. The main independent use of water is domestic. Mojave Public Utility District maintains two wells approximately four miles northeast of the project area, in Section 22, Township 11 North, Range 12 West, SBBM, although these are not the primary wells for the Utility District. Most of the Mojave municipal water is currently obtained from other wells north of Mojave and from the Antelope Valley

# HYDROGRAPH

Well No. T10N/R 12W-13H1

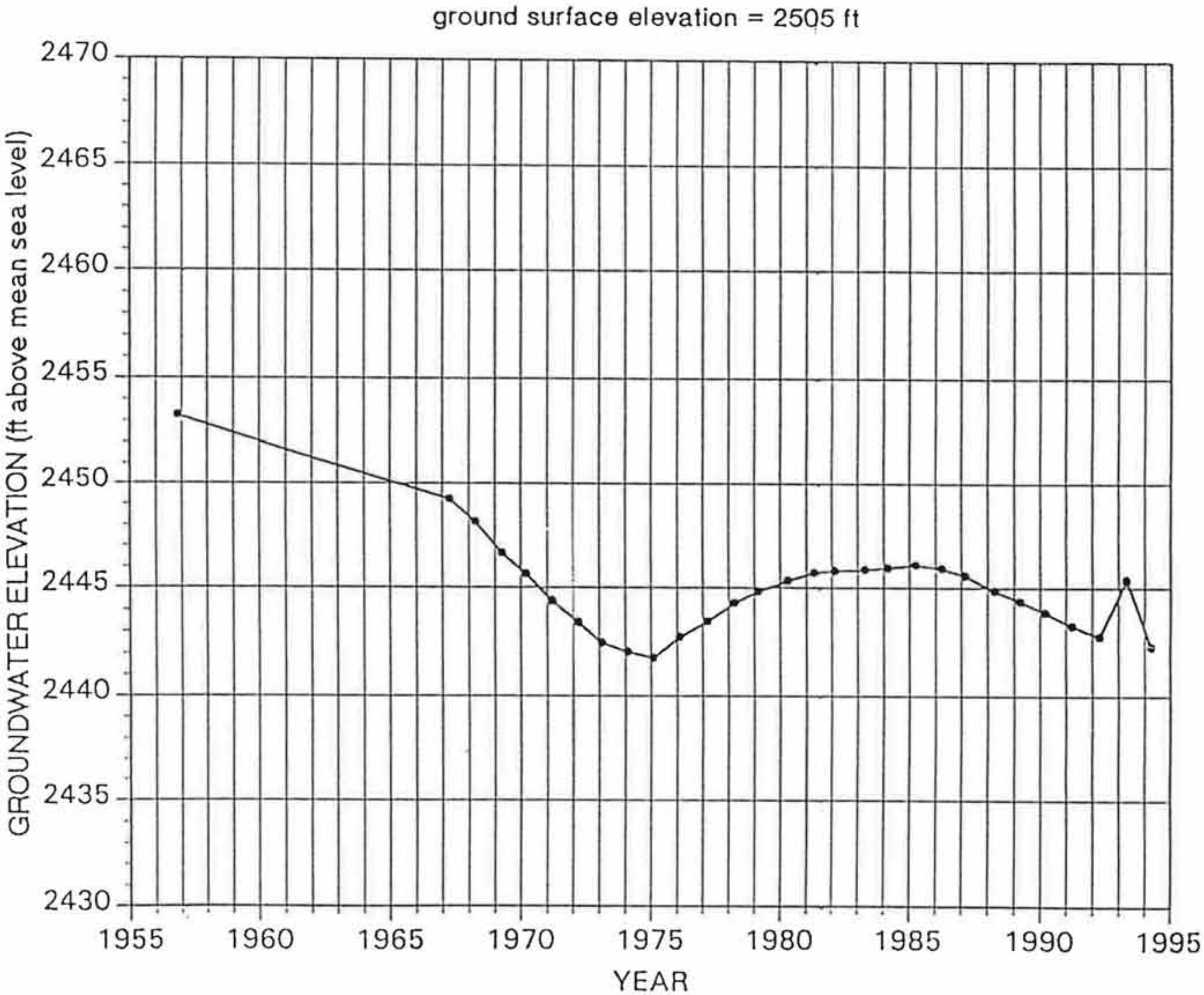



**EXHIBIT 3.4-3**
0733.0010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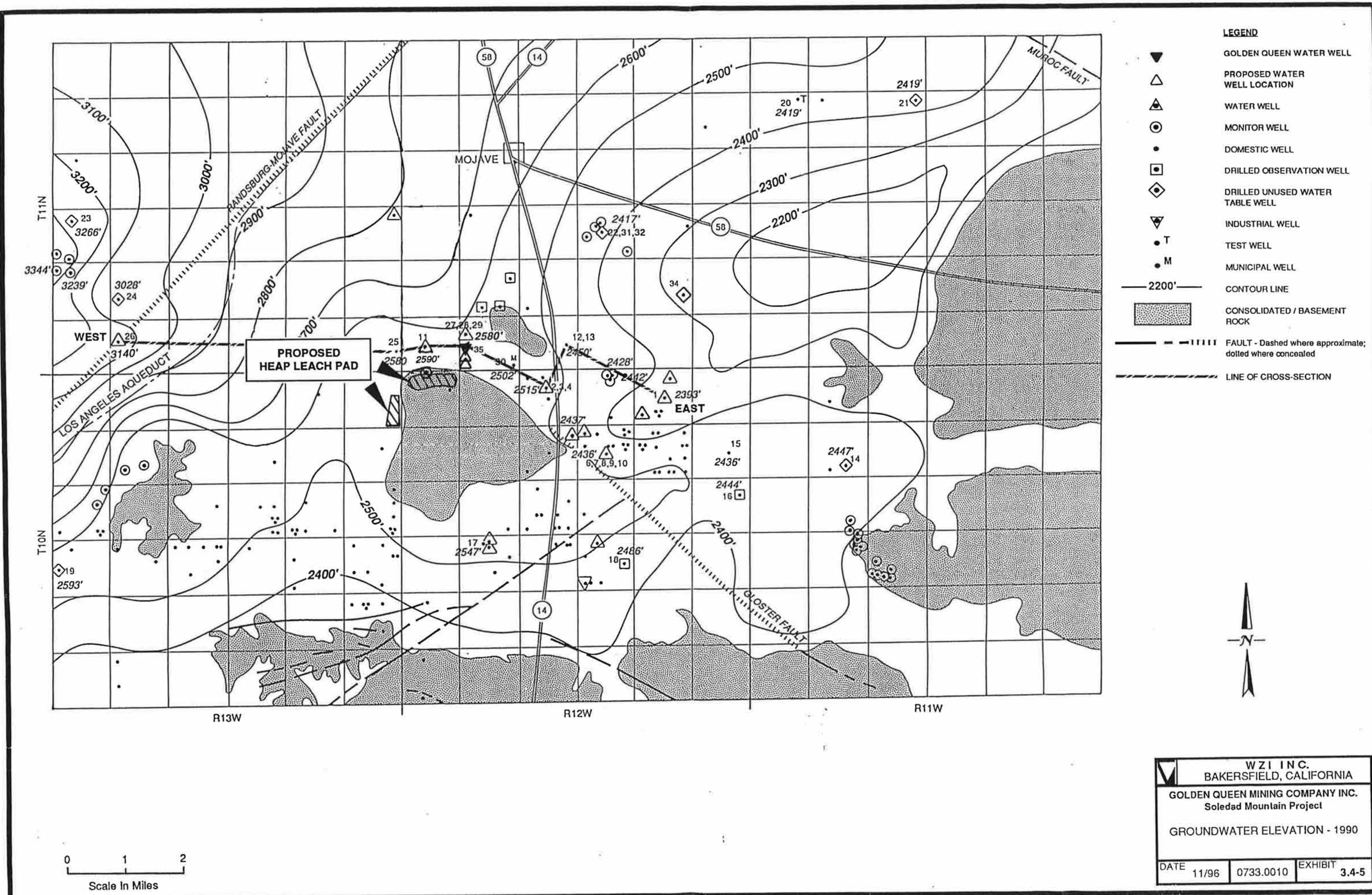
Soledad Mountain Project

WELL LOCATION MAP

| DATE 11/96 | 0733.0010 | EXHIBIT 3.4-4 |
|---|---|---|

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GOLDEN QUEEN MINING COMPANY INC.
Soledad Mountain Project

GROUNDWATER ELEVATION - 1990

| DATE 11/96 | 0733.0010 | EXHIBIT 3.4-5 |
|---|---|---|

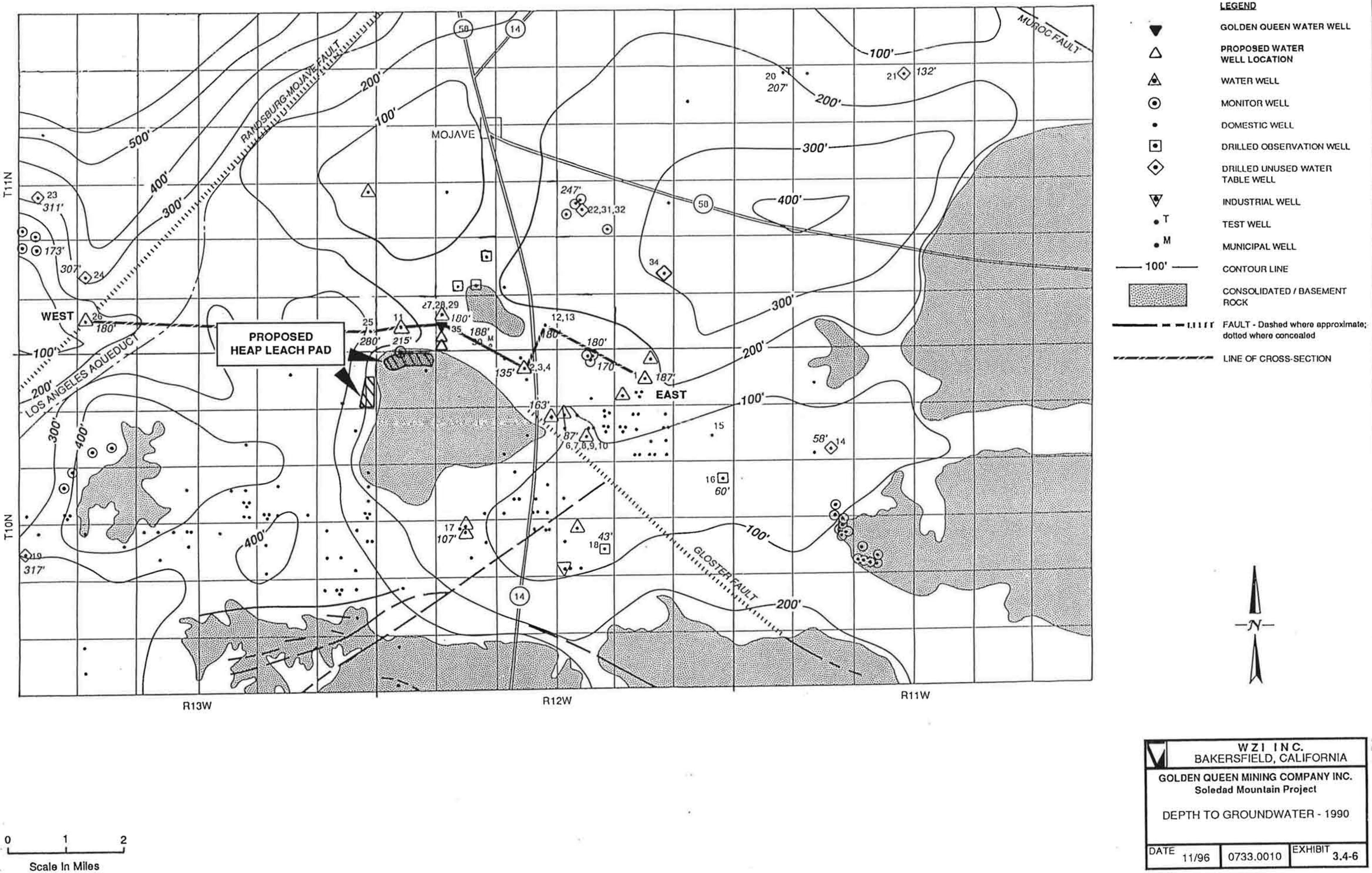
Antelope Valley East Kern Water District (AVEK) which provides imported surface water via pipeline to the area.

Historically water supply wells have been used to supply irrigation water for alfalfa farms. From approximately 1959 through 1970, the Jameson Ranch, located in Sections 22, 26, 27, and 31, Township 11 North, Range 12 West, SBBM, used approximately 2,500 gallons of water per minute. The drawdown was 40 to 50 feet at the center of the depression (Yelverton, 1972). A radius of approximately 2 1/2 miles showed a drawdown of approximately 10 feet. After pumping ceased in the early 1970's the water table rose approximately 35 feet around the water well within 5 years, then continued to rise more slowly after that.

Available data indicates that total dissolved solids in the groundwater of the area ranges from approximately 200 to 500 mg/l (Appendix VIII). The dominant anions appear to be sulfate and bicarbonate with concentrations on the order of 100 to 200 mg/l. Chloride concentrations are in the range of 10 to 40 mg/l. Calcium is the predominant cation with concentrations generally ranging from 50 to 100 mg/l followed by sodium with concentrations on the order of 40 to 50 mg/l. Arsenic concentrations in groundwater in the vicinity of Soledad Mountain generally exceed the maximum contaminant level of 0.05 mg/l arsenic in drinking water. Beneficial uses of the groundwater basin include municipal, agricultural, industrial, and freshwater replenishment.

Golden Queen drilled a monitoring well near the site of the proposed heap leach pad which encountered groundwater at approximately 220 feet and reached bedrock at a depth of approximately 250 feet.

In October, 1996, Golden Queen drilled a water supply well located north of the project site in Section 31, Township 11 North, Range 12 West, SBBM, as shown on Exhibit 3.4-4. The well was bottomed at a depth of 300 feet below ground surface and the static water level was measured at 177 feet below ground surface. A depth to groundwater map is shown as Exhibit 3.4-6.

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GOLDEN QUEEN MINING COMPANY INC.
Soledad Mountain Project

DEPTH TO GROUNDWATER - 1990

| DATE 11/96 | 0733.0010 | EXHIBIT 3.4-6 |
|---|---|---|

The water supply well was pump tested at multiple rates from 500 to 750 gpm and was analyzed for determination of aquifer parameters as well as long term reliability as a water supply source. The aquifer appears capable of supplying the required amount of water from this well. However, a total of three water supply wells, located in Section 31, Township 11 North, Range 12 West, SBBM, will be used, as needed, to minimize drawdown.

An existing water well is located near the new water supply well and is leased by Golden Queen. The well construction is insufficient to supply the required water for the project, therefore, the water well will be inactive during the project life.

One well located 1 to 1.5 miles northwest of the project site in Section 36, Township 11 North, Range 13 West, SBBM, known as one of the Gillis wells, reportedly tested at rates of 750 gpm and 900 gpm. This well is located in a much thicker part of the alluvium with greater than 630 feet penetrated and 250 to 350 feet of thickness below the water table. Other wells in the immediate vicinity are primarily used for residential benefit, are mostly very low yield wells, and are bottomed at less than 300 feet. Other industrial wells are located east, north, and west of Soledad Mountain and have yields ranging from 250 to 1,000 gpm. A summary of existing water well data is included as Exhibit 3.4-7. The relationship of groundwater elevation and known bedrock is shown in cross section on Exhibit 3.4-8.

Direct/Indirect Impacts - A project would have a significant effect on the environment if implementation of the project would result in the degradation of groundwater quality, degradation or depletion of the groundwater resources, or interference with groundwater recharge.

# SUMMARY OF EXISTING WATER WELL DATA

| REF NO. | LOCATION | TOTAL DEPTH (FT) | DEPTH TO WATER (FT) | REPORTED YIELD (GPM) | COMMENTS |
|---|---|---|---|---|---|
| 1 | T10N, R12W, SEC 2 | 257 | 187 | | TERMINATED ON "GRANITE" |
| 2 | T10N, R12W, SEC 4 | 340 | 135 | | TERMINATED ON "HARD ROCK" |
| 3 | T10N, R12W, SEC 4 | 275 | 175 | 3 | |
| 4 | T10N, R12W, SEC 4 | 222 | 186 | 1 | TERMINATED ON "HARD ROCK" |
| 5 | T10N, R12W, SEC 9 | 238 | 163 | 6 | ALLUVIUM TOTAL DEPTH |
| 6 | T10N, R12W, SEC 10 | 200 | 87 | 30 | ALLUVIUM TOTAL DEPTH |
| 7 | T10N, R12W, SEC 10 | 204 | 93 | 35 | ALLUVIUM TOTAL DEPTH |
| 8 | T10N, R12W, SEC 10 | 202 | 93 | 35 | |
| 9 | T10N, R12W, SEC 10 | 200 | 92 | 30 | |
| 10 | T10N, R12W, SEC 10 | 200 | 85 | 25 | |
| 11 | T11N, R12W, SEC 31 | 350 | 215 | 40 | PUMP LIMITATION |
| 12 | T11N, R12W, SEC 33 | 240 | 175 | FAIR | YIELD REPORTED AS "FAIR" |
| 13 | T11N, R12W, SEC 33 | 252 | 190 | | TERMINATED IN "BEDROCK" |
| 14 | T10N, R11W, SEC 8 | 280 | 58 | | |
| 15 | T10N, R12W, SEC 12 | 224 | 84 | | |
| 16 | T10N, R12W, SEC 13 | 185 | 60 | | |
| 17 | T10N, R12W, SEC 20 | | 107 | | |
| 18 | T10N, R12W, SEC 22 | 242 | 43 | | |
| 19 | T10N, R13W, SEC 19 | 770 | 317 | | |
| 20 | T11N, R11W, SEC 7 | 414 | 209 | | |
| 21 | T11N, R11W, SEC 9 | 422 | 131 | | IN ALLUVIUM |
| 22 | T11N, R12W, SEC 22 | 350 | 247 | | |
| 23 | T11N, R13W, SEC 19 | 430 | 311 | | |
| 24 | T11N, R13W, SEC 29 | 749 | 307 | | IN ALLUVIUM |
| 25 | T11N, R13W, SEC 36 | 630 | 280 - 380 | 750 | ALLUVIUM TOTAL DEPTH |
| 26 | T11N, R13W, SEC 32 | 300 | 180 | | TOP 50 FEET ALLUVIUM |
| 27 | T11N, R12W, SEC 32 | 300 | | 40 | |
| 28 | T11N, R12W, SEC 32 | 265 | 180 | 40 | |
| 29 | T11N, R12W, SEC 32 | | 176 | | |
| 30 | T11N, R12W, SEC 32 | 245 | 188 | | |
| 31 | T11N, R12W, SEC 22 | 350 | 260 | 250 | MOJAVE P.U.D. WELL |
| 32 | T11N, R12W, SEC 22 | 348 | 270 | | "ROCK" AT TOTAL DEPTH |
| 33 | T11N, R12W, SEC 22 | 395 | 223 | 1000 | MOJAVE P.U.D. WELL |
| 34 | T11N, R12W, SEC 26 | 230 | | 200 | FORMER JAMESON RANCH IRRIGATION WELL |
| 35 | T11N, R12W, SEC 32 | 300 | 177 | 700 | NEW GOLDEN QUEEN WATER WELL |

REVISED FROM WATER WASTE AND LAND, INC., 1990, HYDROLOGY STUDY SUMMARY FOR THE SOLEDAD MOUNTAIN PROJECT.

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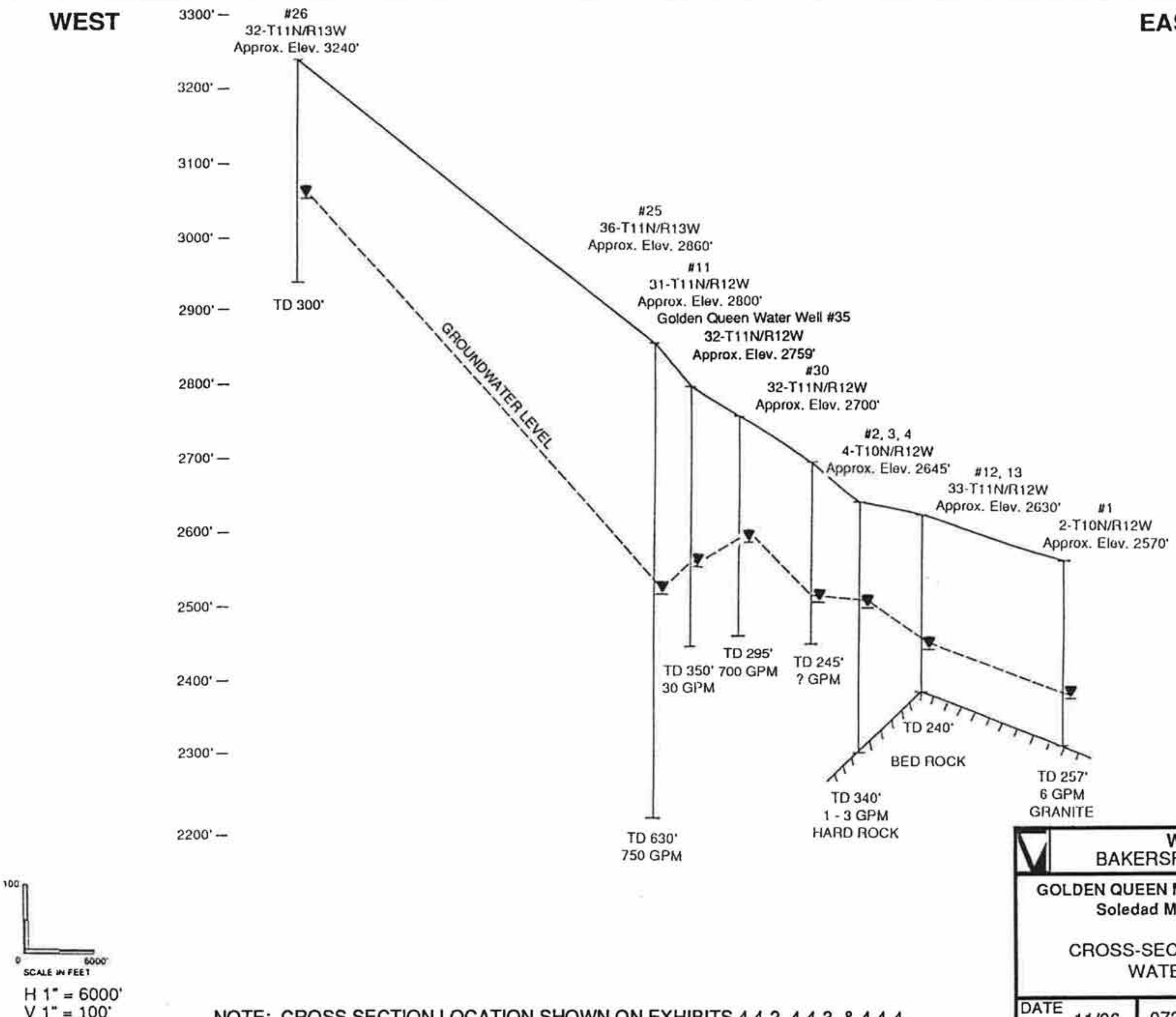
BCJ 11/20/98




NOTE: CROSS SECTION LOCATION SHOWN ON EXHIBITS 4.4-2, 4.4-3, & 4.4-4

WZI INC.
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GOLDEN QUEEN MINING COMPANY INC.
**Soledad Mountain Project**

CROSS-SECTION THROUGH WATER WELLS

| DATE | | EXHIBIT |
|---|---|---|
| 11/96 | 0733.0010 | 3.4-8 |

Pumping of groundwater will lower the groundwater table in the proximity of the installed well(s). The groundwater is approximately 177 feet below ground surface in the vicinity of the water wells. Over the 10-15 year project life, based upon a withdrawal rate of approximately 750 gpm, drawdown is expected to be 39 to 41 feet at the nearest currently operating well located approximately 3,700 feet west of the water wells.

Based on calculations included in Appendix VIII, groundwater drawdown should not exceed 30 feet at a distance of 2 miles from the water supply wells during the life of the project. Using the Jameson Ranch wells as an analog, the actual drawdown could be approximately 10 feet or less. The groundwater level will recover to within 80% of the pre-project level within 5 years after use of the wells is discontinued. This is a conservative estimate, assuming no recharge and a perennial yield of zero. Golden Queen will monitor drawdown in the water supply wells to check that drawdown does not occur beyond the predicted amount. The impact to the groundwater quantity is considered **Less Than Significant**.

A Report of Waste Discharge will be prepared and submitted to the Lahontan Regional Board as discussed in Section 2.2.4.1. Waste Discharge Requirements adopted by the Lahontan Regional Board will incorporate a monitoring program to ensure compliance. A double liner system and a leachate collection and removal system will be provided at each heap leach pad, along with vadose zone and groundwater monitoring systems as described in Section 2.2.4.1 to protect the soil and groundwater from contamination.

The structure housing the processing equipment will have a zero liquid discharge design with specially lined collection basins. Above ground fuel storage tank areas will be bermed and specially lined to prevent soil contamination. Fueling areas, maintenance areas and used oil storage areas will be built on concrete pads and specially lined to prevent soil contamination as described in Section 2.2.3.3 and 2.2.3.7.

The Proposed Action is not anticipated to degrade groundwater quality or interfere with groundwater recharge due to the regulatory requirements and project design features. Therefore, the impact is considered **Less Than Significant**.

Irreversible/Irretrievable Commitment of Resources - Golden Queen plans to use 750 gallons of water per minute during the main phase of the project. The use of this water, approximately 18,000 acre feet over the life of the project, represents an irretrievable use of resources. However, the groundwater will be replaced in the basin by future recharge and the groundwater levels are projected to return to within 80% of normal in approximately five (5) years. In addition, the projected annual water use is less than 7% of the estimated annual recharge to the basin.

Cumulative Impacts - There are no other foreseeable projects planned in the area of Soledad Mountain and, therefore, there are no cumulative impacts to groundwater associated with the proposed project.

Recommended Mitigation - Impacts to the groundwater are less than significant and no mitigation measures are proposed.

Residual Impacts - Based on the criteria identified, there would be no residual impacts to the quantity or quality of the groundwater in the area as a result of the proposed project.

## 3.5 Meteorology and Air Quality

The meteorology and air quality section discusses the background weather conditions and background concentrations of certain pollutants around the proposed site as well as the impacts of the proposed project on background conditions. Section 1.7.1 contains a general discussion of air quality regulations and ambient air quality standards.

### 3.5.1 Meteorology

Setting - The proposed project is located in Kern County in the high desert (Mojave) portion of the Southeast Desert Air Basin. The Southeast Desert Air Basin includes the hottest and driest portions of California. The air basin is separated from the coastal regions by two mountain ranges which provide a climatological boundary. Relative humidity in the desert during summer is very low with humidities below 10 percent common in the hottest part of the day.

Temperatures can exceed 100° Fahrenheit for sixty to seventy days per year between May and September with almost no rainfall. Seasonal differences are noted principally by differences in temperature with hot, dry summers and mild, dry winters. Diurnal variations of approximately 30°F can occur throughout the year. Wintertime temperatures are cool with highs in the 50's during the day and lows dropping into the 30's or less at night.

Annual average rainfall in Mojave, located approximately 5 miles northeast of the project site, is 6.14 inches per year and in Palmdale, located approximately 25 miles south, is 6.92 inches per year. Table 3.5-1 shows monthly rain and temperature information from nearby locations. Weather information from Edwards Air Force Base, approximately 25 miles east of the project location was used to describe wind speed and wind direction in the general vicinity of the project. Published data for thirteen years, from 1958 through 1970, shows a mean wind speed of 8.3 miles per hour and a resultant direction of 250 degrees (out of the west-southwest direction). The strongest winds at Edwards occur in the spring and summer during the late afternoon period (California Air Resources Board, 1992).

A meteorological station was established on the project site from October 1989 through August 1991. This meteorological station conformed to the United States Environmental Protection Agency guidelines. Appendix IX contains the meteorological data from October 1989 through June 1990 along with the sampling protocol for the meteorological

**TABLE 3.5-1 AVAILABLE WEATHER DATA**

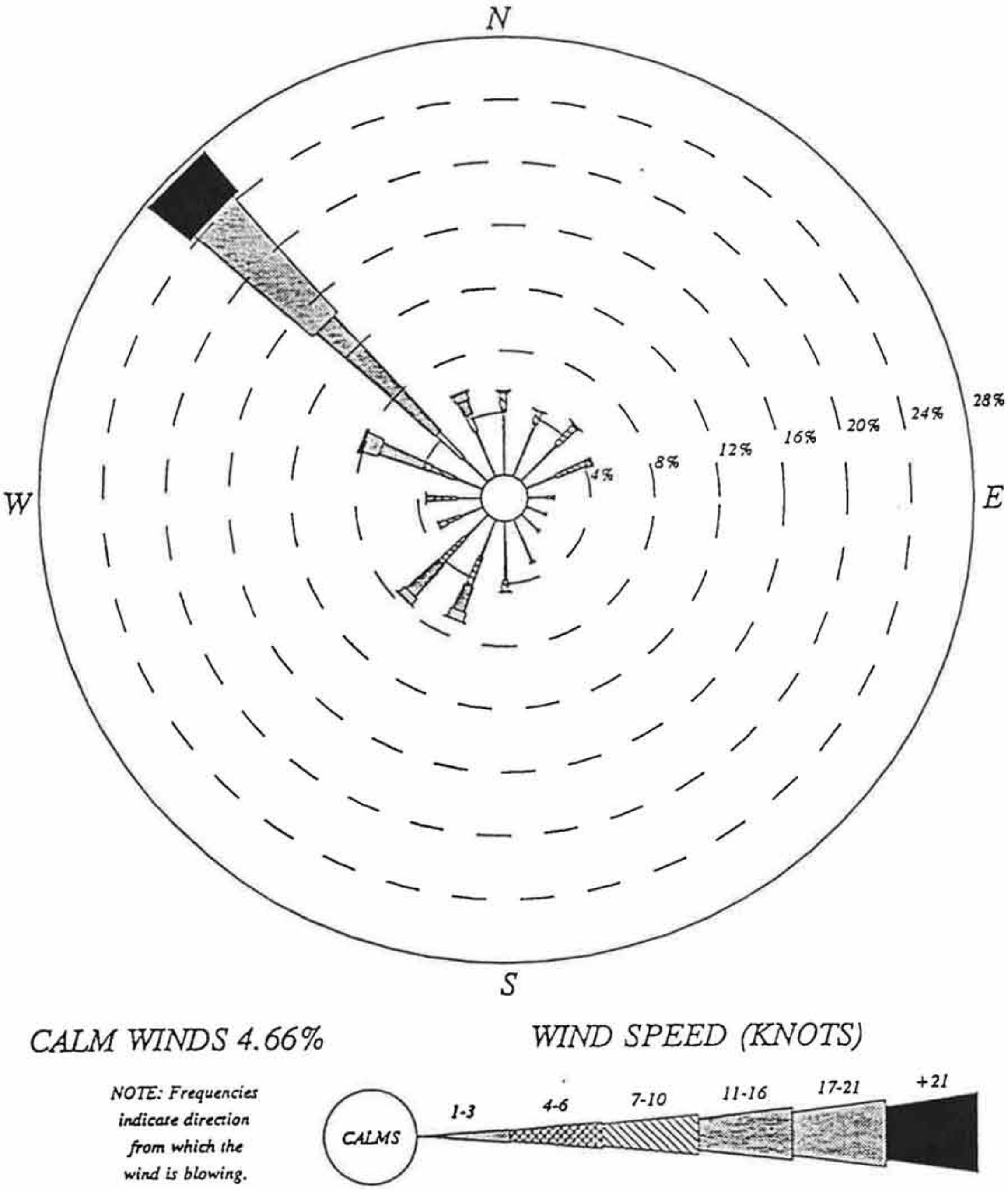
| Month | AVERAGE TEMPERATURE (°F)[1] | | | RAIN (inches)[2] | |
|---|---|---|---|---|---|
| | Minimum | Mean | Maximum | Mojave | Palmdale |
| January | 30.6 | 43.6 | 57.1 | 1.10 | 1.23 |
| February | 34.4 | 47.8 | 61.2 | 1.11 | 1.29 |
| March | 39.0 | 51.9 | 64.7 | 0.91 | 1.13 |
| April | 44.0 | 57.9 | 71.7 | 0.32 | 0.41 |
| May | 52.1 | 65.9 | 79.7 | 0.11 | 0.13 |
| June | 59.9 | 74.6 | 89.2 | 0.05 | 0.06 |
| July | 65.7 | 80.8 | 95.7 | 0.16 | 0.05 |
| August | 63.7 | 79.3 | 94.8 | 0.20 | 0.18 |
| September | 56.7 | 82.7 | 88.7 | 0.30 | 0.25 |
| October | 46.1 | 62.1 | 78.0 | 0.25 | 0.23 |
| November | 35.2 | 50.4 | 65.6 | 0.83 | 0.95 |
| December | 28.7 | 42.9 | 57.0 | 0.80 | 1.01 |
| Mean Annual | 46.3 | 60.8 | 75.3 | 6.14 | 6.95 |

(1) From Lancaster for the period January 1969 to December 1993.
(2) From "Monthly Station Normals of Temperature, Precipitation, and Heating and Cooling Degree Days 1961-1990, California", U.S. Department of Commerce National Climactic Data Center; James R. Owenby and D.S. Ezell, January 1992.

monitoring program. The temperature and wind information gathered has very similar characteristics to the Edwards data. Exhibits 3.5-1 and 3.5-2 show wind rose information for the periods October 1989 to September 1990 and September 1990 to August 1991. Typical winds at the proposed project site are out of the northwest representing flow from the San Joaquin Valley.

Soledad

October 1989 to September 1990; Midnight - 11 PM

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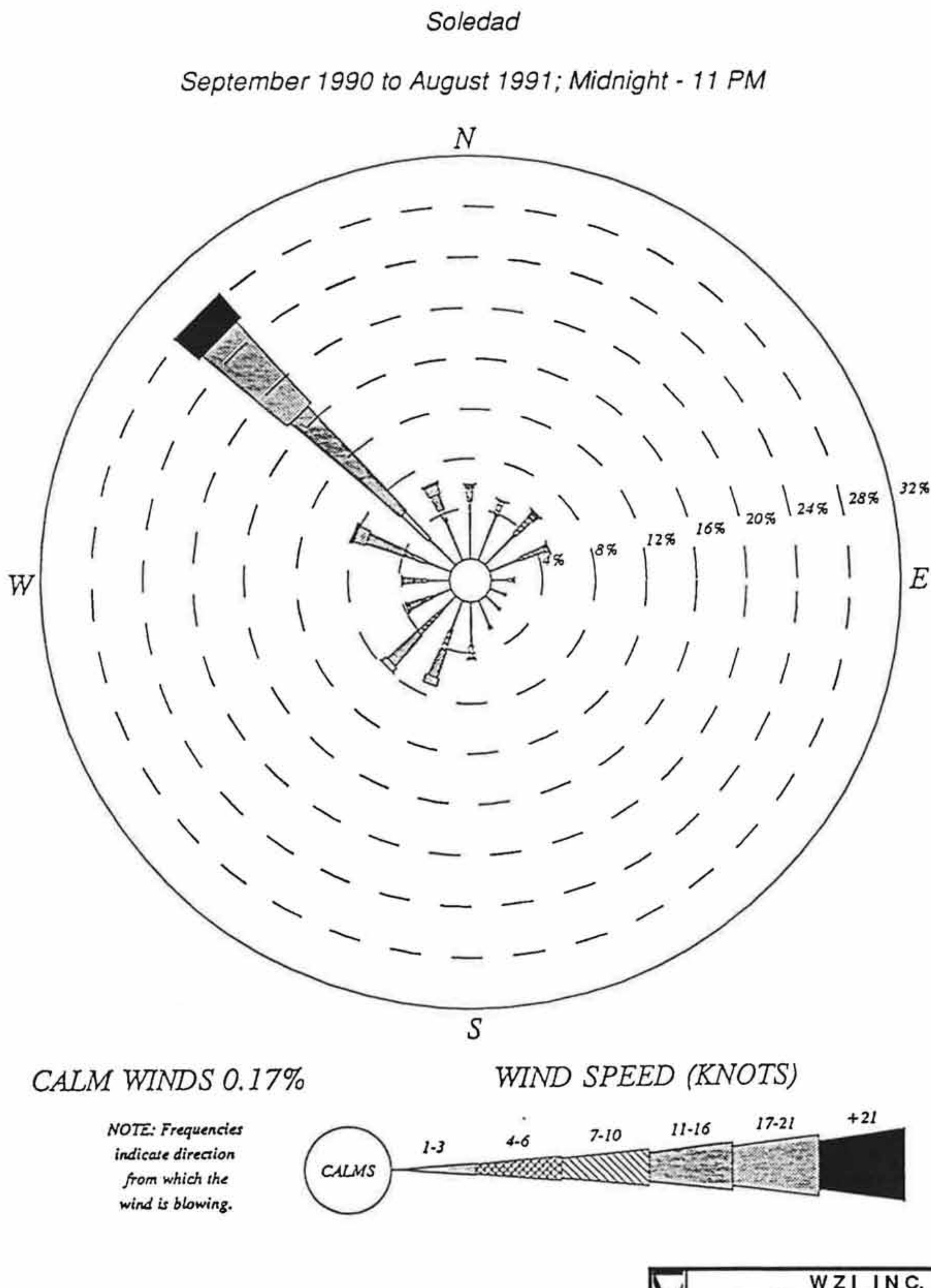
**Soledad Mountain Project**

WIND ROSE DIAGRAM
ONSITE DATA 1989-1990

| DATE 11/96 | 0733.0010 | EXHIBIT **3.5-1** |
|---|---|---|




WZI INC.
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GOLDEN QUEEN MINING COMPANY INC.
Soledad Mountain Project

WIND ROSE DIAGRAM
ONSITE DATA 1990-1991

| DATE 11/96 | 0733.0010 | EXHIBIT 3.5-2 |
|---|---|---|

Direct/Indirect Impacts - There will be no direct or indirect impacts upon the weather patterns in the area surrounding the project site resulting from the project itself.

Irreversible/Irretrievable Commitment of Resources - No meteorological resources are committed to this project, thus, no irreversible or irretrievable commitment is being made. Cumulative Impacts - No cumulative impacts to the local meteorology are expected from this project.

Recommended Mitigation - Since there are no impacts, no mitigation is required.

Residual Impacts - There are no residual impacts to the meteorology.

### 3.5.2 Air Quality

Setting - Monitoring stations located at Mojave, Lancaster, China Lake, and Trona monitor concentrations of certain criteria pollutants in the air. The criteria pollutants are defined and discussed in Section 1.7.1.1. Table 3.5-2 shows the concentrations from 1994 at these monitoring stations which are considered representative of the concentrations at the project site. $PM_{10}$ levels in the region vary greatly. High winds and the arid climate may account in part for the high $PM_{10}$ levels experienced at the monitoring stations. Each monitoring station setup is different and not all pollutants are sampled at each monitoring station.

$PM_{10}$ is the primary pollutant of concern since high winds or increased surface disturbance can elevate $PM_{10}$ concentrations. Principal existing sources of $PM_{10}$ in and around the project area are vehicle traffic on unpaved roads and naturally occurring windblown dust. Exhibit 3.5-3 shows the $PM_{10}$ concentrations from 1988 through 1994 from Mojave. The average 24-hour concentration at Mojave decreased approximately one-third between 1989 and 1994 from 28.6 $\mu g/m^3$ to 17.9 $\mu g/m^3$.

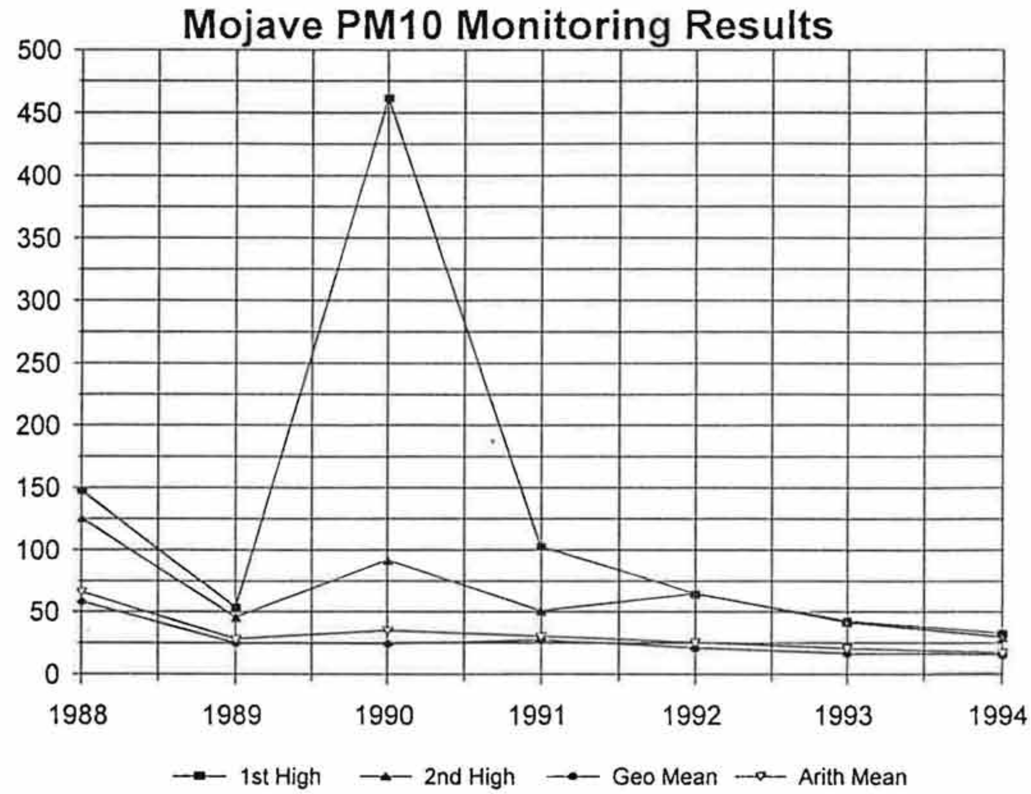
**TABLE 3.5-2 BACKGROUND CONCENTRATIONS(1)**

| POLLUTANT | | MONITORING STATION | | | |
|---|---|---|---|---|---|
| | | Mojave | Lancaster | China Lake | Trona |
| Ozone (ppm) | 1-Hour | 0.12 | 0.14 | | 0.10 |
| $NO_2$ (ppm) | 1-Hour | 0.06 | 0.10 | | 0.06 |
| | Annual Average | 0.008 | 0.018 | | 0.10 |
| $SO_2$ (ppm) | 1-Hour | | | | 0.01 |
| | 24-Hour | | | | 0.01 |
| | Annual Average | | | | 0.001 |
| $PM_{10}$ ($\mu g/m^3$) | 24-Hour | 33 | 97 | 26 | 107 |
| | Annual Geometric Mean | 16.1 | 27.7 | 13.7 | 24.2 |

(1) Concentrations from CARB, California Air Quality Data: Summary of 1993 Air Quality Data; Gaseous and Particulate Pollutants, Technical Services Division, 1994

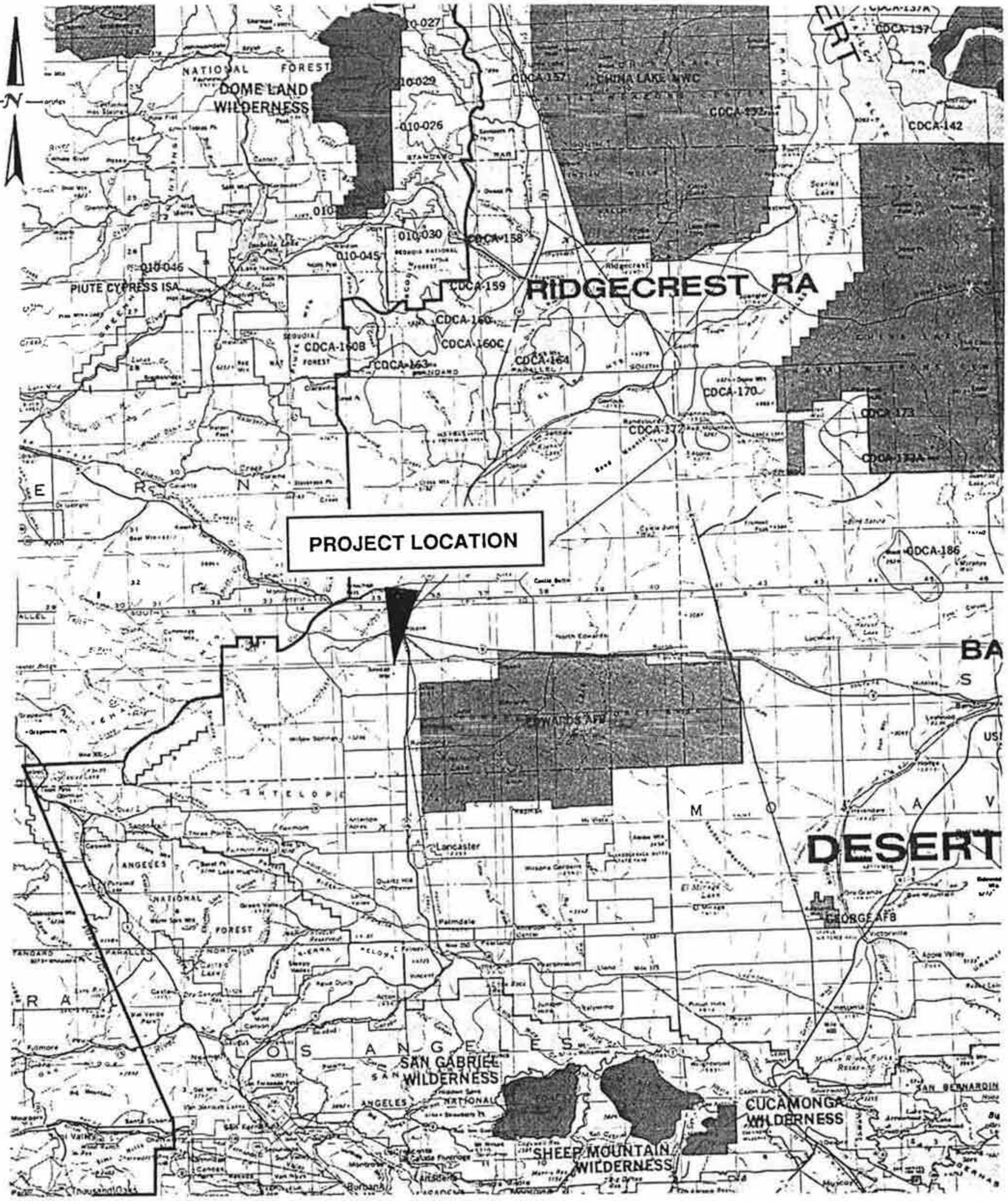
For a period of approximately one year during 1990 and 1991, Golden Queen authorized the collection of $PM_{10}$ concentration data to determine existing ambient $PM_{10}$ levels in the project area. This data has been evaluated by Air Sciences Inc. of Denver, Colorado. Continuous 24-hour samples were collected every three days at two adjacent sampling stations. Out of 238 attempts, 233 samples were valid and were analyzed. A total of 116 24-hour periods have two readings. Two stations were used in order to cross check data for accuracy. The data is fairly consistent with a low of 4.6 $\mu g/m^3$, a high of 50.9 $\mu g/m^3$, an arithmetic mean of 21.7 $\mu g/m^3$, and a geometric mean of 18.8 $\mu g/m^3$. These results are similar to, though approximately one-third less than, the results from the Mojave station located approximately 5 miles north for the same time period.

**EXHIBIT 3.5-3 MONITORED $PM_{10}$ CONCENTRATIONS AT MOJAVE**




Two Class I wilderness areas are located within 100 kilometers of the proposed project area. These include the Dome Land Wilderness, approximately 80 kilometers north of the project area, and the San Gabriel Wilderness Area, located 75 kilometers south-southeast of the project area. Exhibit 3.5-4 shows the relative location of the project site compared to the Class I wilderness areas.

Visibility analysis was evaluated at the two Class 1 wilderness areas using the approved EPA Level 1 Screening analysis in VISCREEN (EPA, 1998b). For a conservative basis, all emissions were assumed to be from the same point. Screening criteria are not exceeded based on the results of the modeling. Exhibit 3.5-5 shows the results of the analysis for the closest of the two Class 1 areas.




Ref: US Dept. of Interior, Wilderness Status Map, 1986

Scale 1:1,000,000
1 inch equals Approximately 16 miles

- Distance to Dome Wilderness is approx. 80 kilometers
- Distance to San Gabriel Wilderness is approx. 75 kilometers
- Distance to Sheep Mountain Wilderness is approx. 80 kilometers

**W Z I INC.**
BAKERSFIELD, CALIFORNIA

**GOLDEN QUEEN MINING COMPANY INC.**
**Soledad Mountain Project**

CLASS I WILDERNESS AREAS
WITHIN 100 KILOMETERS

| DATE | | EXHIBIT |
|---|---|---|
| 11/96 | 0733.0010 | 3.5-4 |

Visual Effects Screening Analysis for
Source: Golden Queen Mining
Class I Area: San Gabriel Mountains

*** Level-1 Screening ***

Input Emissions for

| | | |
|---|---|---|
| Particulates | 21.80 | G /S |
| NOx (as NO2) | .00 | G /S |
| Primary NO2 | .00 | G /S |
| Soot | .00 | G /S |
| Primary SO4 | .00 | G /S |

**** Default Particle Characteristics Assumed

Transport Scenario Specifications:

| | |
|---|---|
| Background Ozone: | .04 ppm |
| Background Visual Range: | 50.00 km |
| Source-Observer Distance: | 76.00 km |
| Min. Source-Class I Distance: | 76.00 km |
| Max. Source-Class I Distance: | 100.00 km |
| Plume-Source-Observer Angle: | 11.25 degrees |
| Stability: | 6 |
| Wind Speed: | 1.00 m/s |

R E S U L T S

Asterisks (*) indicate plume impacts that exceed screening criteria

Maximum Visual Impacts INSIDE Class I Area
Screening Criteria ARE NOT Exceeded

| | | | | | Delta E | | Contrast | |
|---|---|---|---|---|---|---|---|---|
| Backgrnd | Theta | Azi | Distance | Alpha | Crit | Plume | Crit | Plume |
| SKY | 10. | 84. | 76.0 | 84. | 2.00 | 1.155 | .05 | .017 |
| SKY | 140. | 84. | 76.0 | 84. | 2.00 | .185 | .05 | -.009 |
| TERRAIN | 10. | 84. | 76.0 | 84. | 2.00 | .668 | .05 | .007 |
| TERRAIN | 140. | 84. | 76.0 | 84. | 2.00 | .136 | .05 | .005 |

Maximum Visual Impacts OUTSIDE Class I Area
Screening Criteria ARE NOT Exceeded

| | | | | | Delta E | | Contrast | |
|---|---|---|---|---|---|---|---|---|
| Backgrnd | Theta | Azi | Distance | Alpha | Crit | Plume | Crit | Plume |
| SKY | 10. | 25. | 54.3 | 144. | 2.00 | 1.459 | .05 | .019 |
| SKY | 140. | 25. | 54.3 | 144. | 2.00 | .227 | .05 | -.010 |
| TERRAIN | 10. | 50. | 66.4 | 119. | 2.00 | .847 | .05 | .009 |
| TERRAIN | 140. | 50. | 66.4 | 119. | 2.00 | .183 | .05 | .006 |

WZI INC.
BAKERSFIELD, CALIFORNIA

GOLDEN QUEEN MINING COMPANY INC.
Soledad Mountain Project

VISUAL EFFECTS
SCREENING ANALYSIS

| DATE 11/96 | 0733.0010 | EXHIBIT 3.5-5 |
|---|---|---|

Direct/Indirect Impacts - Ozone precursors ($NO_x$ and VOC) will be emitted from the mobile equipment located at the facility. The primary air pollutant which will be emitted during operation of this facility is $PM_{10}$. $PM_{10}$ emissions result from both fugitive and controlled sources. There are three primary phases of operations for this project. They are: construction activities, normal operations, and reclamation activities. Each phase has separate and distinct emissions. When added to the average background concentration of $PM_{10}$ at the project site of 18.8 $\mu g/m^3$, the maximum estimated 24-hour average $PM_{10}$ concentration during normal operations is 45.62 $\mu g/m^3$. Appendix X contains the results of the ambient air dispersion modeling prepared for this analysis including emissions calculations. The federal standard for $PM_{10}$ is 150 $\mu g/m^3$ and the California standard for $PM_{10}$ is 50 $\mu g/m^3$.

Construction Activities - Although temporary in nature, fugitive dust emissions are generated from surface disturbance during construction activities and travel on unpaved roads by vehicles and construction equipment. Increased surface disturbance during construction will increase fugitive dust emissions which will, in turn, cause an increase in total suspended particulates (TSP) and $PM_{10}$ emissions ($PM_{10}$ is that portion of TSP less than 10 microns in size).

Using the fugitive dust emission factor for newly disturbed surfaces associated with construction presented in EPA publication AP-42 "Compilation of Air Pollution Emission Factors", an estimate of the amount of fugitive dust generated by the new construction and associated surface disturbance under the Proposed Action can be calculated. Using the EPA-published emission factor of 1.2 tons of TSP per acre per month for an active construction site, approximately 80 pounds of TSP would be emitted per acre disturbed per actual day of construction activity. This emission rate could be reduced by a minimum of 50 percent (to approximately 40 pounds of TSP per acre per actual day of construction activity) by applying water spray and/or chemical treatment as a dust control measure. Assuming that 75 acres of the project would be disturbed for construction activities an average of 20 days, the total fugitive dust emissions, after the use of dust control measures, would be 30 tons of TSP per

month. These emissions would occur during the initial months of the project, while construction activities are occurring. Golden Queen will utilize water spray and/or chemical treatment as necessary to control fugitive dust emissions during construction.

Normal Operations - For evaluation of air related impacts under normal operating conditions, regulatory agencies base their review on $PM_{10}$ emissions. Federal and state ambient air quality standards are shown in Section 1.7.1.1. Fugitive and controlled emissions are generated from the proposed mining and processing operations. Estimated emissions of $PM_{10}$ from the project are detailed in Appendix X. Table 3.5-3 is a summary of the calculated maximum hourly and annual $PM_{10}$ emissions from the proposed project at the projected annual processing rate of 6.0 million tons per year of ore. Section 2.2.4.2 presents project design features included to minimize the air quality impact of this project.

Reclamation Activities - The primary sources of $PM_{10}$ fugitive emissions during reclamation activities include the loading and unloading of growth media, bulldozing, road emissions, and erosion from disturbed surfaces before vegetation is established.

For purposes of evaluating PSD applicability, it is necessary to determine the total amount of emissions not including fugitive emissions for mining operations. The proposed project will emit less than the PSD limit of 2 tons per year of controlled $PM_{10}$ emissions, therefore, the project is not subject to PSD regulation.

An analysis of the impact on nearby Class I Wilderness areas shows that the incremental increase in 24-hour $PM_{10}$ concentration at either the Dome Land or the San Gabriel Wilderness areas is approximately 0.21 $\mu g/m^3$ which is less than the significance level of 10 $\mu g/m^3$. A visibility screening analysis using the program VISCREEN also shows that the screening criteria are not exceeded so no significant impact to visibility on either of the Wilderness areas is likely.

**TABLE 3.5-3 - ESTIMATED $PM_{10}$ EMISSIONS**

| EMISSION SOURCE | MAXIMUM POUNDS/HOUR | POUNDS/YEAR | TONS/YEAR |
|---|---|---|---|
| **FUGITIVE** | | | |
| Drilling | 0.33 | 2,400 | 1.20 |
| Blasting | 157 | 41,230 | 20.61 |
| Truck Loading | 5.31 | 35,374 | 17.69 |
| Truck Unloading | 2.95 | 28,299 | 14.15 |
| Hauling | 3.15 | 15,975 | 7.99 |
| Dozing | 1.89 | 1,888 | 0.94 |
| Wind Erosion | 0.94 | 8,500 | 4.25 |
| **CONTROLLED** | | | |
| Crushing | 1.43 | 9,551 | 4.78 |
| **TOTALS** | 173.00 | 143,217 | 71.61 |

(1) Calculation of emissions is shown in Appendix F of Appendix X.

Neither the NAAQS nor the CAAQS for $PM_{10}$ will be exceeded by the project. Therefore, implementation of the Proposed Action will have a **Less Than Significant** air quality impact.

There will not be any concentration of vehicle trips or vehicle-related emissions in a localized area which would be expected to cause a violation of any CO ambient air quality standards. No conditions are anticipated which would create a public nuisance condition, therefore, the impact of the Proposed Action is **Less Than Significant**.

Previously disturbed areas located within the project area will be removed as potential sources of air pollution either through reclamation or elimination by mining activity. The tailings pile is located where heap leach pad #1 will be built and is proposed as base material for the heap. This tailings pile is a large emissions generator when the wind speed exceeds the threshold velocity. On the same basis used to calculate emissions from the proposed project, it is estimated that the disturbed acreage has annual emissions of 136,000 pounds of $PM_{10}$ per year. Development of the project will eliminate

the emissions from the tailings piles. The net long term effect is that annual emissions from the project area will be decreased by 126,100 pounds of $PM_{10}$ per year. The long term impact to air quality will be **Beneficial**.

Irreversible/Irretrievable Commitment of Resources - There are no irreversible or irretrievable commitments of air quality resources since, when the project is complete in approximately 15 years, there will be no further related emissions of air contaminants.

Cumulative Impacts - Since there are no other foreseeable projects within at least a 15 kilometer radius there are no cumulative impacts.

Recommended Mitigation - Since there are no significant impacts, there are no recommended mitigation measures.

Residual Impacts - Since there are no significant impacts, there are no residual impacts.

## 3.6 Biology

### 3.6.1 Vegetative Resources

Setting - Plant species found at the project site on Soledad Mountain are typical for the western Mojave Desert area. The plant species are hardy desert shrubs and sub-shrubs which generally grow year-round when moisture is available. Annual species which are fall germinating and grow throughout the winter and spring seasons are also present. The major vegetative species at the site have been summarized in the Biological and Soil Resource Evaluation for the Soledad Mountain Project (Appendix VII). There were no threatened or endangered species identified on the project site. No wetlands, marshes or other environmentally sensitive habitat areas have been identified on the project site. There is no "specimen tree" or other tree with historic value located on the project site. Based on the biological surveys, Soledad Mountain does not contain uncommon physical habitats or populations of rare plants or animals.

The lower slopes and alluvial fans in the project area contain a desert shrub/scrub type vegetation with creosote bush the dominant plant species and secondary cover consisting of burrowbush, aster, goldenhead and joint-fir. The plant cover on the lower slopes ranges from 20% to 26% and averages about 23%.

The mid-slope and upper slope areas of the site are sparsely vegetated by a mixed shrub community with plant species including hopsage, winterfat, buckwheat and cattle spinach. The scant vegetation on the upper slopes is fairly diverse and varies widely depending on the exposure and soil moisture conditions, as well as previous disturbances. Cover in the mixed shrub community of the mid and upper slope ranges from 10% in burned areas to 49% in other areas.

Direct/Indirect Impacts - The Proposed Action would disturb approximately 560 acres of the upper slope area of Soledad Mountain by the excavation of the mine and creation of overburden piles. Approximately 370 acres of the lower slope and alluvial fan areas would also be disturbed by the construction of the heap leach pads, overburden piles, process facility, offices, and ancillary activities. No impacts to endangered, threatened, rare or sensitive plant species are anticipated.

Except for the approximately 265 acres of disturbed area which will be created by the open pit mine (Appendix VI, Table 2.1), site reclamation activities as described in Section 2.2.5 and wildlife protection and monitoring as described in Section 2.2.4.3 will minimize to **Less Than Significant** the overall impacts to vegetation.

Reclamation activities and monitoring include a revegetation plan, onsite seed collection, and test plots to evaluate reclamation methods. Previously disturbed areas inside the project area and outside the proposed disturbance area will be reclaimed as part of the project's ecosystem management program producing a **Beneficial** impact.

Irreversible/Irretrievable Commitment of Resources - Approximately 265 acres of open pit, 270 acres of overburden pile side slopes, and 20 acres of steep slopes in the facilities area will not be reseeded due to the steepness of the pit walls and side slopes. Natural processes will eventually cause some revegetation of these areas and provide habitat for wildlife, however, the vegetation may be different due to changes in steepness of slope, exposure, and moisture conditions.

Cumulative Impacts - There are no cumulative impacts to vegetative resources related to the proposed project.

Recommended Mitigation - The impact of this project to the vegetative resources is less than significant. Therefore, no mitigation measures are proposed.

Residual Impacts - Permanent loss of approximately 555 acres of natural vegetation is a residual impact. The loss is **Less Than Significant** because no rare or unique habitats are affected and there are large amounts of similar undisturbed habitats in the regional area. There are no other residual impacts to the vegetative resources.

### 3.6.2 Wildlife Resources

Setting - The wildlife species present at the project site are typical for desert habitats. General wildlife populations are low due to the arid climate and alteration of habitats by historical mining, recreation, and fires. Surveys of the wildlife species present at the site were conducted and are summarized in the Biological and Soil Resource Evaluation for the Soledad Mountain Project (Appendix VII). No threatened or endangered species have been identified on the project site.

The presence of mammals on the site was confirmed by either observation or other signs such as burrow, scat, tracks, or skeletal remains. Predators that inhabit the site include the coyote, bobcat, ring-tailed cat, gray fox, and possibly badger. Predators use

the site as part of their hunting territory and some may den on the mountain during breeding season.

Small animals on the site which are typical of the desert scrub habitat include antelope ground squirrel, jack-rabbit, cottontail rabbit, kangaroo rat, woodrat, and several species of small rodents. Bird species common to the site include the raven, rock dove, violet green swallow, and sparrows. Large birds include the golden eagle, turkey vulture, red-tailed hawk, and peregrine falcon. Reptile species common in the study area include the side-blotched lizard, desert iguana, gopher snake, and Mojave rattlesnake.

Four animals known to exist in this type of habitat are of possible concern from the threatened, endangered, or special concern species lists for the federal and California agencies. These species are Townsend's big-eared bat, pallid bat, the desert tortoise, and the Mohave ground squirrel. Surveys were conducted for each species and are included in the Biological and Soil Resource Evaluation (Appendix VII). A second survey for bats was conducted in 1996 and the results are included in Appendix VII.

The desert tortoise survey was conducted in specific areas of potentially suitable habitat, although the project area is not designated as prime habitat. No recent active sign or live tortoises were observed on the project site. Tortoises were not found to occur on the project site during surveys in 1995. According to the U.S. Fish and Wildlife Service, recent tortoise surveys have not detected any tortoises west of State Route 14.

The survey for the Mohave ground squirrel (Appendix VII) was carried out in late March and May of 1990. Two trap grids did not result in the capture of a Mohave ground squirrel. The project area is on the edge of the known Mohave ground squirrel range and there are two habitat types on the west flank of the mountain which could support Mohave ground squirrels. The proposed western heap leach pad is in part of the habitat area.

The first survey for bats, especially Townsend's big-eared bat, was conducted in mine openings, including stopes and glory holes, on Soledad Mountain during late March and June 1990 (Appendix VII). During the survey, fifty-five openings were entered and visually inspected for bats, guano, or other animal signs. No evidence of bats was found in the openings or mine workings. One western pipistrelle bat was trapped in a mist net and other pipistrelles and pallid bats were observed flying in the evening. High winds and low counts of flying insects may account for the low bat populations.

The second survey for bats was conducted in August and October, 1996 (Appendix VII). At least two unidentified species of bats were observed in the project area. A winter bat survey will be conducted to determine if bats are hibernating in the mine workings.

Direct/Indirect Impacts - The project will disturb 930 acres of potential wildlife habitat. No threatened or endangered species have been identified on the project site. There were possible sightings of the Townsend's big-eared bat or a pallid bat which are California species of concern. There will be no interference with migratory fish or wildlife species, or with established migratory corridors. The population of wildlife will not drop below self sustaining levels as a result of the proposed project. There will be no loss of riparian lands as a result of the proposed project.

Impacts to wildlife and wildlife habitat during construction and operation of the project will be minimized by containing disturbance within necessary areas only, performing a preconstruction survey, maintaining a 25 mph speed limit, limiting exposure of wildlife to the cyanide solutions by using a closed system, and preventing ponding of the cyanide on the surface of the heap as described in Section 2.2.2.2 and Section 2.2.4.3. Any loss of wildlife on the project site will be reported and measures taken to prevent a reoccurrence. Potential impacts to wildlife are considered to be **Less Than Significant**.

Irreversible/Irretrievable Commitment of Resources - There is no irreversible/irretrievable commitment of wildlife resources related to the proposed project. Revegetation of disturbed areas with native plants will restore the wildlife habitat. In addition, as part of the Proposed Action, some areas disturbed by historical mining activity will be reclaimed.

Cumulative Impacts - There are no cumulative impacts to wildlife resources.

Recommended Mitigation - No mitigation measures are proposed because impacts to wildlife are less than significant.

Residual Impacts - There are no residual impacts to wildlife related to the proposed project.

### 3.7 Cultural and Historical Resources

Setting - Cultural and historical resources on the project site are subject to review according to CEQA and NEPA guidelines. Only important (CEQA) or significant (National Historic Preservation Act) are considered in the assessment of the potential of a Proposed Action to adversely affect the cultural environment.

According to Appendix K of CEQA, if the project may cause damage to an important archaeological resource, the project may have a significant effect on the environment. Damaging effects on an archaeological resource should be avoided whenever feasible. If avoidance is not feasible, the following criteria shall be used to evaluate the importance of the site:

- The archaeological resource is associated with an event or person of (1) recognized significance in California or American history, or (2) recognized scientific importance in prehistory.

- The resource can provide information which is of both demonstrable public interest and useful in addressing scientifically consequential and reasonable or archaeological research questions.

- The resource has a special or particular quality such as oldest, best example, largest, or last surviving example of its kind.

- The resource is at least 100 years old and possesses substantial stratigraphic integrity.

- The resource involves important research questions that historical research has shown can be answered only with archaeological methods.

The evaluation of cultural significance as required by federal law is made with reference to the ability of a site or related group of sites to meet the criteria for eligibility to the National Register of Historic Places (NRHP). As stated in 36 CFR, Part 60.4, these criteria are as follows:

> The quality of significance in American history, architecture, archaeology, and culture is present in districts, sites, buildings, structures, and objects of state and local importance that possess integrity of location, design, setting, materials, workmanship, feeling and association, and:
>
> (1) that are associated with events that have made a significant contribution to the broad patterns of our history; or
>
> (2) that are associated with the lives of persons significant in our past; or
>
> (3) that embody the distinctive characteristics of a type, period, method of construction, or that represent the work of a master, or that possess high

artistic values, or that represent a significant and distinguishable entity whose components may lack distinction; or

(4) that have yielded, or may be likely to yield, information important to prehistory or history.

Soledad Mountain was the scene of previous mining efforts. There have been three main periods of development. During the first period from approximately 1894 to 1910, there was major prospecting and development. The Karma, Queen Esther, and Echo mines were in operation with mills onsite. The Eagle Group and Bobtail Claims were operating but the ore was taken to offsite mills. During the second period from the Depression years until 1942, there were numerous small scale mining efforts and all ore was hauled to Tropico for milling. During the third period from 1942 to the present, there has been a limited amount of mining and exploration.

The early operations involved the establishment of small living groups on Soledad Mountain. The remains of buildings, mining equipment, and residences are evident on the property. Archaeological studies are different for private and federal lands. In accordance with state requirements for private lands, a Phase I Archaeological Survey of the Golden Queen Mine Project Area, Mojave, Kern County, California, with an addendum, and a Phase II Test Excavations and Determinations of Significance on Soledad Mountain, Mojave, Kern County, California, with an addendum, for private property within the subject area were prepared by W & S Consultants. In accordance with federal requirements a Class III Inventory of the Golden Queen Mine Project Area, Mojave, Kern County, California was prepared for all federal lands within the project area by W & S Consultants. All archaeological documents are included as Appendix XI and are summarized in this section. The archaeological studies are treated as confidential information and will be distributed accordingly.

As a result of the archaeological investigations, one prehistoric site and ten historical sites were identified on private property, one historical site was identified and two previously identified sites were reviewed on federal land, and one historical site was identified on both private and federal land within the project boundaries.

The following four sites have been identified as having scientific and historical value in terms of furthering the understanding of the history of the early mining period in Kern County.

CA-KER-4446H is referred to as Cobble City or "Little Italy". It is a complex of building remains, located on private land, which are in a good state of preservation and which have a potential to contribute to the understanding of a period of Kern County history. The site is endangered by downslope movement of tailings from the Queen Esther Mine.

CA-KER-4447H is the Wegmen residential complex located on private land. The complex includes turn of the century, Depression era and recent remains. The site contains information which would contribute to the understanding of early mining patterns in Kern County.

CA-KER-4448H is the Karma Mill complex including a head frame, vertical shaft, and hoist and shop in conditions varying from good to poor. The site, located on private land, contains information which would contribute to the understanding of early mining practices and patterns.

CA-KER-4449H is the Queen Esther Mill which was built in 1903 and operated until 1910 on private land. The mill structure and buildings lack integrity but the site contains information useful for the understanding of early mining history in Kern County.

The following sites were identified on the property but were not considered to contain scientific cultural value for varying reasons.

CA-KER-4450H is the Echo Mill constructed on private land in 1903 and dismantled in 1906. The building remains have been mapped and no more information is expected from this site. However, it might yield information under the surface if uncovered.

CA-KER-4451H is the large Golden Queen Mill site constructed on private land in 1935. The site remains do not contain information of archaeological or historical interest.

CA-KER-4452H is the post World War II Silver Queen Mine complex. The structures, located on private land, are lacking in integrity and scientific interest.

CA-KER-4453H is the Gypsy Starlight area which consists of a cluster of wooden ore chutes and related mine features located on private land. The site is lacking in integrity and does not contain historically important information.

CA-KER-4454H, referred to as the Bobtail site and located on both private and federal land, consists of unrelated mining features of various ages. The site is not considered to contain information of scientific or historical interest.

CA-KER-4455H is the Elephant-Eagle Mill and Mine located on federal land and built during the Depression era. It lacks integrity and has no scientific value. However, the site includes a gyratory crusher which is in good condition.

CA-KER-4693H consists of the remains of at least six structures which represent a small mining camp occupied for a short period of time. There is no evidence of subsurface deposits and the architectural remains are in various stages of collapse.

CA-KER-4694 consists of a low density prehistoric, Late Archaic or later, plant processing station located on private land along the northern margin of a dry mud playa. The site contains surficial artifacts commonly associated with plant grinding.

CA-KER-4695H is a small turn-of-the-century mining camp consisting of a single tent pad adjacent to a historical road or trail on private land. A privy pit has been excavated and the site is not expected to contain any more scientific information.

CA-KER-764H, a group of cobble structures on federal land, was discovered in 1977. The structures appear to be water retention structures but their function is unknown. They are not significant in a contribution to the understanding of the history of the area.

CA-KER-765 was discovered in 1977 on federal land and was believed to be a bedrock grinding slick. It is now believed to be a natural rock feature and without cultural value.

Direct/Indirect Impacts - The historical sites lie in areas which will be disturbed by the excavation of open pits and creation of overburden piles and the heap leach pads. The existing structural remains, surficial and subsurface deposits, and shafts and adits will be affected. Four sites on private land, CA-KER-4446H, CA-KER-4447H, CA-KER-4448H and CA-KER-4449H, which are considered important (CEQA), will be disturbed.

As part of the Proposed Action, artifacts from the historical sites will be used to establish a display of historical mining activities onsite and in the surrounding areas. Three sites of minor interest, CA-KER-4450H, CA-KER-4695H, and CA-KER-4693H, will have an archaeological monitor review the areas during grading activity to record and collect any additional archeological information that may be uncovered during such activity.

The impact to the cultural resources is **Significant** because four historical sites on private land, considered important, will be disturbed.

Irreversible/Irretrievable Commitment of Resources - The historical sites found in the project area will be disturbed by the excavation of open pits and creation of overburden piles and the heap leach pads. However, the sites with scientific and historical value will have been subject to a Phase III Data Recovery (salvage excavation and architectural recording).

Cumulative Impacts - There are no cumulative impacts to the cultural resources in the area.

Recommended Mitigation - If avoidance and site preservation of cultural resouces is not feasible, a Significant impact can be reduced to **Less Than Significant** by conducting a Phase III Data Recovery (architectural recording and salvage excavation) on the affected sites. It is recommended that a Phase III Data Recovery be conducted on four historicalally important sites: CA-KER-4446H, 4447H, 4448H and 4449H.

Residual Impacts - As a result of the proposed mitigation measures, the residual impact to the cultural resources will be **Less Than Significant**. The Phase III Data Recovery will actually preserve artifacts and information which would be lost to continued decay, providing a **Beneficial** impact.

### 3.8 Paleontological Resources

Setting - Sòledad Mountain is a silicic volcanic center consisting of felsic flows, tuffs, and breccias of Middle to Late Miocene age. The rock types range from rhyolite to quartz latite. The volcanic rocks are overlain by alluvial sediments on the flanks of Soledad Mountain.

Sedimentary rocks are exposed as part of the Bissell Formation in the Bissell Hills east of Soledad Mountain and the Fiss Fanglomerate in the Rosamond Hills south of Soledad Mountain. These formations, approximately Miocene in age, do not contain fossils. The closest exposed fossiliferous sedimentary rocks, part of the Miocene Horned Toad

Formation, are located 7 miles north of Soledad Mountain and northwest of Mojave in the Horned Toad Hills. The Horned Toad Formation is not shown to extend as far south as Soledad Mountain (Dibblee, 1967 and Slade, 1994).

Direct/Indirect Impacts - Because of their igneous and metamorphic origin, the rock types to be mined as a result of the proposed project are not likely to contain fossils that might be lost or damaged by the project. The heap leach pads and some of the overburden material will be placed on top of alluvium. The alluvium is non-marine and not expected to contain fossils. The Proposed Action will not cause physical disturbance of, or prevent future access to, a unique paleontological site. Impact will be **Less Than Significant**.

Irreversible/Irretrievable Commitment of Resources - There is no irreversible/irretrievable commitment of paleontological resources related to the proposed project.

Cumulative Impacts - There are no cumulative impacts to the paleontological resources related to the proposed project.

Recommended Mitigation - No paleontological resources are expected to occur in the project areas, therefore, no mitigation is proposed. However, should unidentified paleontological resources be discovered during project operations, Golden Queen will notify Kern County or the BLM, depending upon whether the resources are located on private or public lands, respectively.

Residual Impacts - There are no residual impacts to the paleontological resources related to the proposed project.

### 3.9 Visual Resources

Setting - The visual resources comprise the visual quality and character of the project site and the surrounding region. Land surface, water, vegetation, and other natural or

man-made features make up the scenic quality of the landscape. These properties can be described in terms of the visual elements of form, line, color, and texture.

The landscape characteristics, or form, of the project area consist of broad relatively flat alluvial areas with steep hills/mountains rising above the desert floor at various locations. Soledad Mountain, the project site, is a volcanic peak approximately 3 miles in diameter rising more than 1,000 feet above the surrounding desert. The visual line, the path the eye follows, is predominately horizontal. The flat, broad valleys allow long distance views and the horizontal line results from the contact of the ground and vegetation with the sky. The line is broken by vertical changes such as Soledad Mountain. The landscape color consists of browns, tans and grays. Vegetation colors are generally browns, greens, yellows and tans. Because of the limited vegetation cover, landscape colors meld with vegetation colors from distant view points. Texture, the visual manifestation of the interplay of light and shadows, is subtle because of the uniformity of the broad valleys, sparse vegetation and colors.

Several open pit mines are located in the area. All the mines have visual contrasts created by roads, open pits, overburden piles and, in the case of gold mines, heap leach pads. Several industries along State Route 14 and the windfarms in the Tehachapi Mountains contribute to existing visual contrasts.

The project area is visible from major travel routes along State Route 14 and State Route 58 passing through the Mojave area to the north and east of the project site. The project area is also visible from Silver Queen Road, a county road which provides access to the project site and borders the north and west sides of the project site. The project area is in the foreground from the local road and in the background from the state highways. Approximate traffic on Silver Queen Road is 410 average daily trips while approximate traffic on State Route 14 as reported in 1995 is 15,000 ADT (personal communication, Cal-Trans).

Residents along Backus Road view Soledad Mountain from the south and will be able to see portions of the overburden piles. Residents along Silver Queen Road will have a direct view of the heap leach pad and the mine. Most residents of Camelot Park do not have an uninterrupted view of Soledad Mountain from the north because of the proximity of the houses to each other and the distance to Soledad Mountain.

The significant majority of the visitors to the project site will be mine employees, contractors and other mine-related personnel. Access to the actual mining operations will be limited by the company for safety and security reasons.

The visual resources of the project area were investigated using methods outlined in Section 8400 of the BLM Manual. Using these methods, the resources are analyzed by considering the scenic quality, viewer sensitivity and the distance between the viewer and the proposed modification of the landscape. The BLM visual resource management (VRM) system, which was developed by the BLM for identifying, evaluating and classifying visual resources of public lands, assigns a management class rating from I through IV by inventorying and evaluating both scenic quality and the sensitivity of a landscape (Table 3.9-1). Discussions with Mr. Dave Wash at the BLM Office in Ridgecrest indicate that the BLM has not assigned a VRM rating to lands in the project area.

The Master Environmental Assessment/Master Environmental Impact Report for the Kern County General Plan, based upon the BLM VRM classes presented below, assigns a management class rating of II to the area around Soledad Mountain. The area along State Route 14 north to and including Mojave is assigned a management class rating of III.

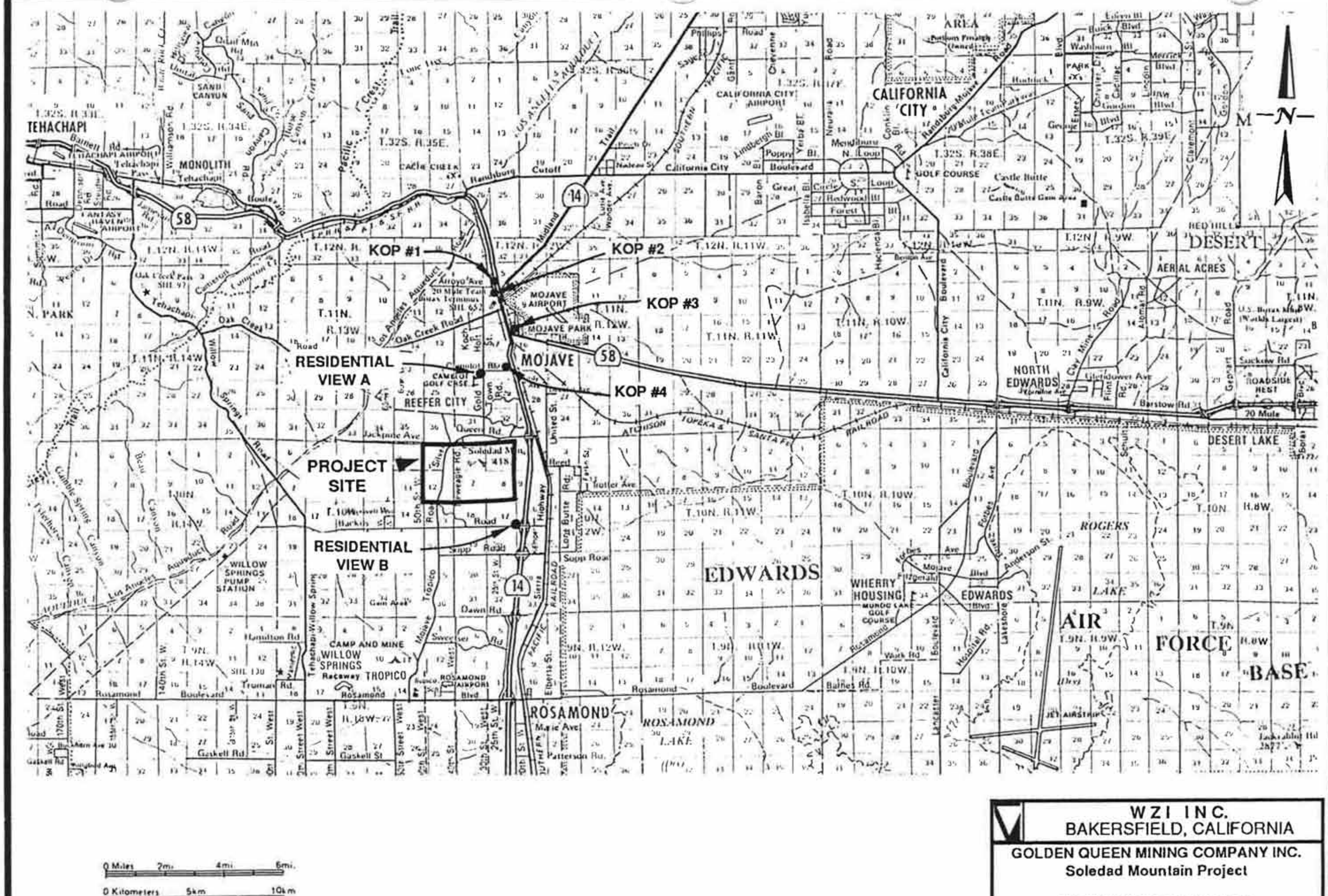
## TABLE 3.9-1

## BLM VISUAL RESOURCE MANAGEMENT CLASSES

| CLASS | DESCRIPTION |
|---|---|
| I | The objective of this class is to preserve the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention. |
| II | The objective of this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color and texture found in the predominant natural features of the characteristic landscape. |
| III | The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention, but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape. |
| IV | The objective of this class is to provide for management activities which require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high. Management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic element. |

Contrast ratings were conducted from four (4) selected viewing locations, using methods outlined in Section 8400 of the BLM Manual. These Key Observation Points (KOPs), shown in Exhibit 3.9-1, were selected to represent the view from the intersections of major highways and local roads which carry the majority of traffic flow in the Mojave area and represent locations where the general public will view the project site. Visual contrast rating sheets and photographs are included in the Visual Resource Evaluation (Appendix XII). All photographs represent the view from the passenger seat of an automobile located at the KOP.

KOP #1 represents a view of the project area from State Route 58 and Arroyo Avenue north of Mojave. This intersection provides access to residential housing and is inside the 30 mile per hour speed zone approaching Mojave from the north. The foreground view is composed of power poles, highway signs, billboards and railroad tracks. The middleground is composed of power poles, residential housing and open space. The background is composed of Soledad Mountain and other distant mountains.




WZI INC.
BAKERSFIELD, CALIFORNIA

GOLDEN QUEEN MINING COMPANY INC.
Soledad Mountain Project

VISUAL IMPACT ANALYSIS
KEY OBSERVATION POINTS (KOP)
AND RESIDENTIAL VIEWS

| DATE 11/96 | 0733.0010 | EXHIBIT 3.9-1 |
|---|---|---|

KOP #2 represents a view of the project area from State Route 58 and State Route 14 north of Mojave. This intersection is controlled by a traffic signal. The foreground view is composed of power poles, highway signs, billboards and railroad tracks. The middleground is composed of power poles, residential housing and open space. The background is composed of Soledad Mountain and other distant mountains.

KOP #3 represents a view of the project area from State Route 58 and State Route 14 in downtown Mojave. This intersection is controlled by a traffic signal. The foreground view is composed of power poles, highway signs, billboards and railroad tracks. The background is composed of Soledad Mountain.

KOP #4 represents a view of the project area from State Route 14 and Camelot Boulevard south of Mojave. This intersection provides access to residential housing at the Camelot housing tract. The foreground view is composed of pavement, highway signs and markers for various buried utilities. The middleground is composed of open space and the existing Granite Construction Company aggregate operations at Standard Hill. The background is composed of Soledad Mountain.

In addition to KOP's for major travel routes, the Visual Resource Evaluation included two residential views. Appendix XII contains a view (A) looking south from the south edge of the Camelot housing development and a view (B) looking northwest from the corner of State Route 14 and Backus Road. Locations are shown on Exhibit 3.9-1.

The view from the Camelot housing development is obscured for many residents by other houses. Those residents with a view of Soledad Mountain see only the upper slopes of the mountain in the background of the view. The foreground is composed of chain link fencing, grasses and shrubs.

The view from State Route 14 and Backus Road represents the view for residents along Backus Road. The foreground and middleground consist of open space with vegetation. The background is dominated by Soledad Mountain.

A third residential view, as shown in Exhibit 3.2-3, is from four residences located just north of the project area off Silver Queen Road. The foreground is composed of vegetation. The middleground is composed of tailings from previous mining activity. The background is composed of Soledad Mountain where historical mining activity, including roads and tailings, is visible. The tailings from previous mining create a strong color contrast in the landscape.

Direct/Indirect Impacts - Impacts to visual resources from the activity during the operating life of the project will result from the visibility of surface disturbance associated with construction and operation of project facilities, the creation of overburden piles, the creation of the heap leach facilities, the creation of the open pit mine, and the occasional dust plumes resulting from blasting in the open pit mines. These impacts will occur over a period of up to 20 years. Impacts to visual resources on completion of the project after closure, reclamation and revegetation will be less. Additionally, impacts to visual resources vary depending on the viewpoint, whether from a distant viewpoint or from a nearby residence.

Photographs of current conditions, taken from each KOP, and photographic simulations of the Proposed Action are presented in Appendix XII. Standard 4"x 6" prints illustrate the current conditions and the Proposed Action as viewed by the naked eye from each KOP. Enlargements to 8" x 10" are used to outline and discuss the Proposed Action. Standard 4" x 6" prints of the current views and 8" x 10" simulations of the Proposed Action as viewed from the two residential areas are also presented in Appendix XII.

The operations plan calls for portable lighting units which will be used in the active working areas in the mine and on the overburden piles. The facilities will be lighted for safety 24-hours per day. The lights will be visible from the KOP's, however, all lighting will be directed toward the working areas and shielded.

All structures will be designed with neutral colors that will blend with the surrounding area. The heap leach pads, open pit mine, overburden piles, and access road constructed as part of the Proposed Action will represent a noticeable visual contrast for nearby residential viewers north of the project. A noticeable visual contrast for nearby residential viewers south of the project site will be the result of overburden piles only.

The visual contrasts will be less noticeable from a distance for casual viewers, those traveling along State Routes 14 and 58. The Proposed Action, as viewed in relationship to other current and historical activities in the area will only be a weak contrast to the existing regional landscape and the impact to visual resources is considered **Less Than Significant**.

Implementation of the reclamation plan will reduce some of the impacts associated with the surface disturbance over the long term. Existing roads and exploration drilling sites which are not necessary to provide operating and exploration access to the proposed project site will be recontoured and reclaimed to minimize visual impacts at the proposed project. As part of the project's adaptive management program, some existing overburden piles from previous mining activity within the proposed disturbance will be reclaimed and/or revegetated as described in the Reclamation Plan and Revegetation Procedures (Appendix VI). The heap leach pads and overburden piles resulting from open pit mining as part of the proposed project will also be recontoured as part of the reclamation and closure activities at the site.

The form of the reclaimed project will approach the form of the surrounding landscape, however, some areas will remain discontinuous and there will be some areas of angular line. The color of the reclaimed project will approach that of the surrounding landscape.

The open pit mine will remain as a permanent change to the line and form of the area. Due to the steepness of the pit walls, the pit walls will be in shadow during certain times of the day and year. The shadows will cause the pit walls to blend with other features on the mountain.

Views from residences located immediately north of Soledad Mountain and to a lesser extent along Backus Road south of Soledad Mountain will have less contrast after reclamation. As a result of final reclamation, the heap leach pads and overburden piles, which repeat the basic elements of form, line, color and texture of the rest of Soledad Mountain, will no longer attract attention. The visual impact will be reduced.

Operations under the Proposed Action will cause some visual contrast with the surrounding land from more distant viewpoints, even after reclamation. However, when the Proposed Action is viewed in relationship to other current and historical activities there is only a weak contrast. The project area, with the implementation of the Proposed Action, would contrast slightly with the existing environment. Due to the viewing distance from the major travel routes, viewer sensitivity to the visual resources is considered to be low to moderate.

All the mining projects in the area are subject to reclamation procedures which will reduce the impact to the visual resources. The proposed project will not alter the existing appearance to the casual viewer because the type of activities outlined in the Proposed Action are consistent with past activities in the area.

The visual impacts from the Proposed Action will be **Less Than Significant** when compared to the currently existing conditions and surrounding views.

Irreversible/Irretrievable Commitment of Resources - The landscape will have a permanent change, however, the basic elements of form, line, color, and texture of Soledad Mountain will be similar to the existing features.

Cumulative Impacts - There are no reasonably foreseeable projects in the area. Therefore, the cumulative impact to the visual resources is **Less Than Significant**.

Recommended Mitigation - Mitigation measures for lessening the visual impacts are part of the project design, including reclamation and revegetation.

Residual Impacts - The change in topography and landscape of Soledad Mountain represent residual impacts. After reclamation the change in the visual resources of the project area will not be unlike surrounding areas, repeating the basic visual elements and may not be noticeable to the casual observer from major traveled routes. The impact is **Less Than Significant**.

### 3.10 Noise

Setting - Noise is generally defined as unwanted or objectionable sound. Sound is technically described in terms of the loudness (amplitude) of the sound and the frequency (pitch) of the sound. Sound levels are usually measured and expressed in decibels (dB). The decibel measurement is logarithmic, meaning each increase of one decibel is a ten fold increase in noise.

Because the human ear is not equally sensitive to sound at all frequencies (human hearing is less sensitive to low and extremely high frequencies than mid-range frequencies), the A-weighted decibel scale (dBA) has been devised to relate noise to human sensitivity and rank the intensity of sound.

In Kern County, the standards for noise levels are established in the Noise Element of the Kern County General Plan. The goals of the Noise Element and General Plan are to (1) ensure that residents of Kern County are protected from excessive noise and moderate levels of noise are maintained and (2) protect the economic base of Kern County by preventing the encroachment of incompatible land uses near known noise producing roadways, industries, railroads, airports and other sources. The plan states that industrial uses or operations should "be designed or arranged so that they will not subject residential or other noise sensitive land uses to exterior noise levels in excess of 65 dB $L_{dn}$". The $L_{dn}$ scale represents a time weighted 24-hour average noise level based on the A-weighted decibel (dBA).

The project area is located in a sparsely populated rural area, with the nearest occupied residences located approximately 2,900 feet northwest and 4,250 feet southwest of proposed blasting, loading and crushing areas, and 1,100 feet north and 2,500 feet southwest of the heap leach pads and overburden piles.

The principal existing sources of noise in the area are sonic booms from military aircraft, vehicle traffic on nearby roads, including State Route 14 and Silver Queen Road, and diesel locomotives on the railroad tracks east of the site. The local terrain is complex, which produces areas where noise from the mining and processing operations may be sheltered.

Ambient noise level data collection was conducted at a location in the northwest corner of the project site across Silver Queen Road by Air Sciences Inc. during the following periods:

May 31, 1990 - Jul 5, 1990
Aug 31, 1990 - Oct 3, 1990
Nov 30, 1990 - Jan 5, 1991
Feb 28, 1991 - Apr 5, 1991

Appendix XIII contains the Ambient Baseline Noise Monitoring Plan, a summary of the Noise Level Data Collection and Processing Methods, and a tabulation of the data showing the Leq (total sound energy of a time-varying sound level over a given period of time, in this case, one hour), the Lmax (the maximum level in a given period, in this case, one hour), and the L90 (the level exceeded 90 percent of the time over one hour, which excludes noise levels of short duration). A summary of this information is shown in Table 3.10-1. The highest noise level is the maximum dBA which occurred during the hour with the highest level of noise. The lowest noise level is the maximum dBA which occurred during the hour with the lowest level of noise.

| TABLE 3.10-1 AMBIENT NOISE LEVEL MONITORING RESULTS | | | |
|---|---|---|---|
| Leq (dBA) | L90 (dBA) | Lmax (dBA) | Notes |
| 66 | 52.5 | 83 | Highest Noise Level |
| 30 | 29.5 | 30 | Lowest Noise Level |

Direct/Indirect Impacts - The noise which will be generated by the proposed project falls into identifiable noise patterns, including: engine noise and back-up alarms from haul trucks, loaders and other vehicles; blasting, crushing and screening equipment; and miscellaneous equipment noise from the process plants, shop and office. Noise from the haul truck engines and loader operations occurs when the trucks are filled with material in the open pit mines. Truck engine noise is also associated with hauling the materials to the overburden material piles or the crusher. Vehicle back-up alarm noise will be generated in the open pit mines, on the overburden material piles, and at the crusher location. Noise from the truck and loader activities will occur 24-hours per day, 7-days per week. Noise from the crushing equipment will occur 24-hours per day, 7-days per week. Blasting will normally occur once a day during daylight hours.

The noise generated by typical mining operations can be as intense as 95 dBA at 25 feet. Blasting may cause very short-duration noise levels in excess of 100 dBA at 25 feet. Typically, a noise reduction of 6 dBA occurs as the distance from a noise source is doubled. The nearest occupied residence is 2,900 feet from an active mining area where blasting will occur, which will result in a maximum noise level at the residence of 54 to 59 dBA outside the residence. The maximum noise level outside the occupied residence nearest to an overburden or heap leach pile (approximately 1,100 feet) is estimated to be 56 dBA.

Noise contours were generated assuming continuous noise of 95 dBA at various locations around the project site perimeter coincident with overburden dumping, ore processing operations, and truck operations. The noise reduction was calculated by distance from the source as described above and the calculations are included in Appendix XIII. The contours are shown on a land use map with existing houses and

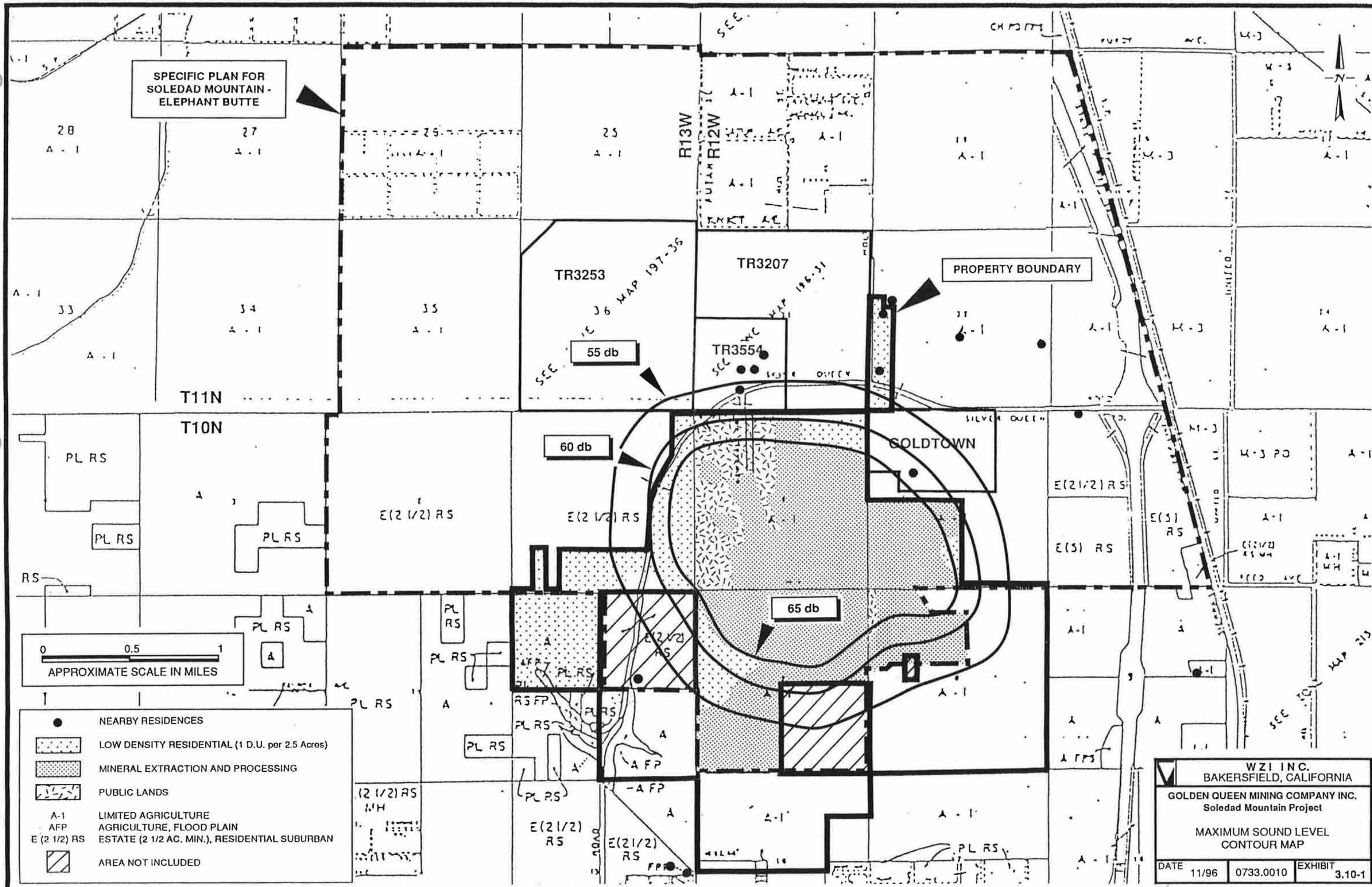
areas designated for residential development (Exhibit 3.10-1). The 60 dBA contour does not reach occupied residences but crosses the Goldtown area which is zoned for residential housing. The house shown in Goldtown is unoccupied and the owner has been unable to obtain an occupancy permit. Golden Queen Mining Company has acquired or is in the process of acquiring the houses adjacent to the project site located on Silver Queen road in Tract 3554 and the one house on Mojave-Tropico Road on the west side of Soledad Mountain. The 60 dBA contour falls outside the property boundary within a small portion of Section 1, Township 10 North, Range 13 West, SBBM, which is zoned for residential use.

The maximum anticipated noise levels generated by operations at the Soledad Mountain Project are within the limits recommended by the Noise Element of the Kern County General Plan and will result in minimal impacts to the human environment. Construction activities will be scheduled to take place primarily during daylight hours in order to minimize impacts from construction noise on nearby residents. Internal combustion engines on the heavy construction machinery will be equipped with mufflers to minimize noise. During the operating life of the project, there will be an increase in ambient noise levels which will be perceptible to humans in the project vicinity, but these levels will not exceed maximum existing levels measured in the vicinity of the project area and are considered to be **Less Than Significant**.

Irreversible/Irretrievable Commitment of Resources - There is no irreversible or irretrievable commitment of noise resources associated with the project.

Cumulative Impacts - There are no cumulative impacts to noise resources associated with the project.

Recommended Mitigation - Impacts to noise resources are less than significant and no mitigation measures are proposed.


SPECIFIC PLAN FOR SOLEDAD MOUNTAIN - ELEPHANT BUTTE
PROPERTY BOUNDARY
R13W
R12W
T11N
T10N
TR3253
TR3207
TR3554
55 db
60 db
65 db
GOLDTOWN
0
0.5
1
APPROXIMATE SCALE IN MILES
NEARBY RESIDENCES
LOW DENSITY RESIDENTIAL (1 D.U. per 2.5 Acres)
MINERAL EXTRACTION AND PROCESSING
PUBLIC LANDS
A-1 LIMITED AGRICULTURE
AFP AGRICULTURE, FLOOD PLAIN
E (2 1/2) RS ESTATE (2 1/2 AC. MIN.), RESIDENTIAL SUBURBAN
AREA NOT INCLUDED
WZI INC.
BAKERSFIELD, CALIFORNIA
GOLDEN QUEEN MINING COMPANY INC.
Soledad Mountain Project
MAXIMUM SOUND LEVEL CONTOUR MAP
DATE 11/96
0733.0010
EXHIBIT 3.10-1

Residual Impacts - There are no residual impacts to noise resources related to the proposed project.

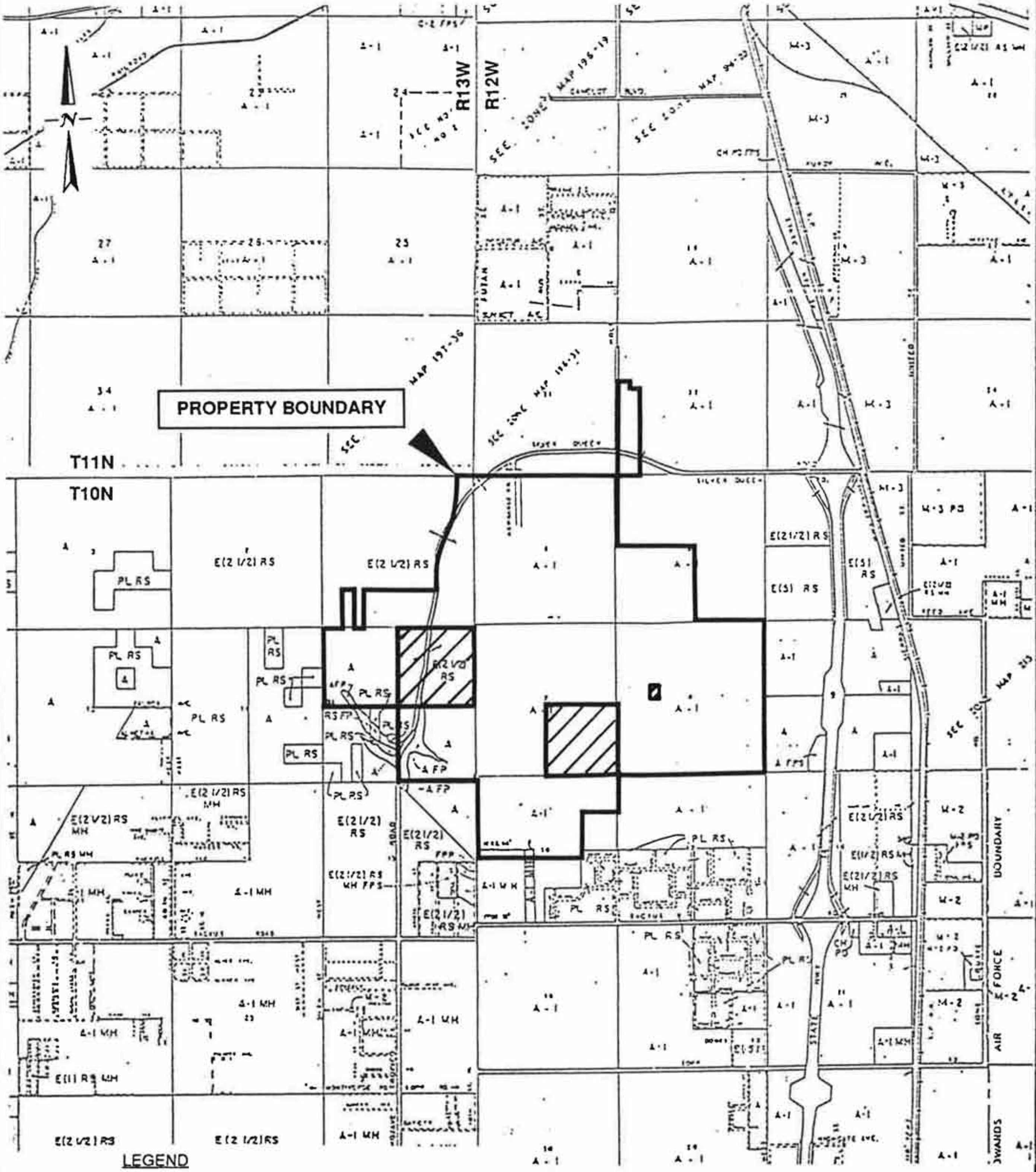
## 3.11 Land Use

### 3.11.1 Zoning

Setting - The zoning within the project area is governed by the Kern County Planning Department. The majority of the land acquired by Golden Queen is zoned A-1 (Limited Agriculture) (Exhibit 3.11-1). The primary land use within the project area consists of mineral exploration, mineral development and open space. The land east and south of the project site is also zoned A-1 while the land to the north and west is zoned E (2 1/2) (estate residential, minimum parcel size 2 1/2 acres). One of the factors that may have contributed to the low level of residential development in the area is the lack of a potable water supply primarily due to the high arsenic concentrations. The Specific Plan for Soledad Mountain - Elephant Butte and Vicinity - South of Mojave states that lot sizes should be limited to a minimum of 2 1/2 acres. The project area does not contain any prime agricultural land. The only agricultural use mentioned in the Specific Plan is grazing.

The Kern County Zoning Ordinance permits mining and mineral extraction in the existing zoning districts within the project area subject to a Conditional Use Permit and approved Reclamation Plan. The specific chapters of the zoning ordinance for each of the referenced Kern County zoning districts are: Chapter 19.12 (A), Chapter 19.14 (A-1), Chapter 19.16 (E), and Chapter 19.6 (RS).

The California Business and Professions Code (§11000 et seq) requires the issuance of public reports from the California Real Estate Commissioner before unimproved land which has been subdivided into five or more lots in unincorporated areas can be sold, leased or offered for sale (§11018.2). The requirements of §11000 et seq. extend to the purchaser of five or more lots in an existing subdivision.




LEGEND

| | |
|---|---|
| A-1 | LIMITED AGRICULTURE |
| AFP | AGRICULTURE, FLOOD PLAIN |
| E (2 1/2) RS | ESTATE (2 1/2 AC. MIN.), RESIDENTIAL SUBURBAN |
| | AREA NOT INCLUDED |

0 1 2

APPROXIMATE SCALE IN MILES

WZI INC.
BAKERSFIELD, CALIFORNIA

GOLDEN QUEEN MINING COMPANY INC.
Soledad Mountain Project

ZONING MAP

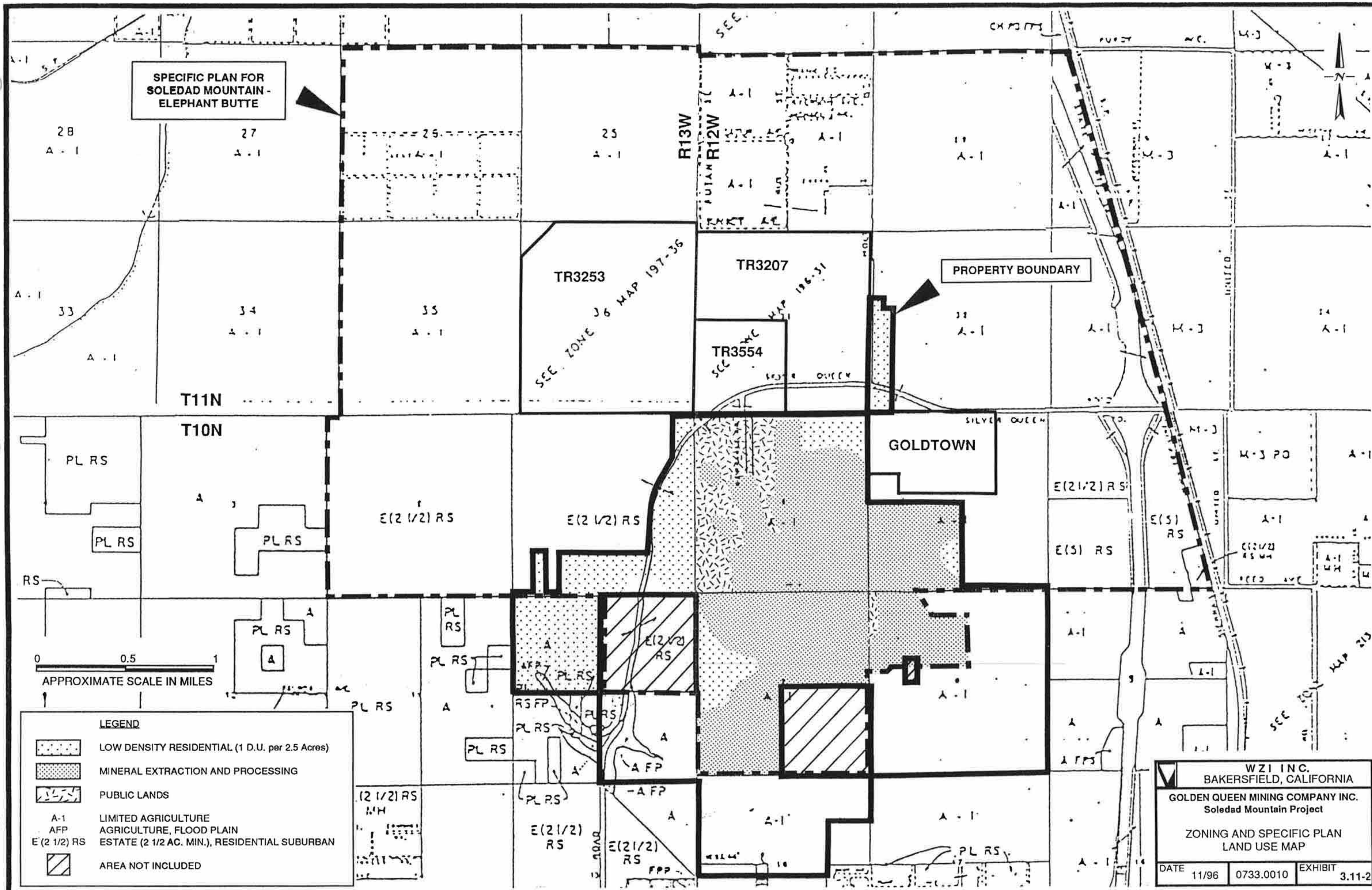
| DATE 11/96 | 0733.0010 | EXHIBIT 3.11-1 |
|---|---|---|

There are several locations in the vicinity of the project where land has been divided into 2 1/2 acre parcels. Three tract maps have been recorded on property directly north of the project (Exhibit 3.11-2). These tracts lie within property zoned E (2 1/2), and the lot sizes on these tracts are approximately 2 1/2 acres each. Tracts 3554 and 3207 are located in Section 31, Township 11 North, Range 12 West, SBBM. A California Department of Real Estate report was filed on Tract 3554 but was never completed and was eventually abandoned (DRE file 023742). The Department of Real Estate does not have a record of a report for Tract 3207.

Tract 3253 is located in Section 36, Township 11 North, Range 13 West, SBBM. A Department of Real Estate report was first issued on February 7, 1992 and was last amended on May 16, 1996 (DRE file 009371SA-A16). The report states that individual septic systems will be used for sewage disposal and that private water wells are the only source of water. The report further states that, "There is no guarantee of quality, quantity or availability of water on each lot or parcel."

The Townsite of Goldtown is zoned A-1 and lies east of the project site within the North 1/2 of Section 5, Township 10 North, Range 12 West, SBBM (Exhibit 3.11-2). The subdivision map for the Townsite of Goldtown was filed in 1923. Goldtown remains undeveloped except for a single structure located at 2805 Ophir Ave. The Kern County Planning Department issued a building permit for a single family residence at this location in 1992; however, a certificate of occupancy has not been issued. The file remains pending with the Kern County Planning Department.

The lots within Goldtown are 25 feet X 110 feet, therefore, most property owners own more than one lot. The Specific Plan for Soledad Mountain - Elephant Butte and Vicinity -South of Mojave states that, "The Townsite of 'Goldtown' must be recognized as unique within the Plan area since the existing lot sizes and resultant ownerships create densities that are not consistent with adopted precise zoning nor the recommended density for residential development. Alternatives must be proposed and adopted to provide for the


SPECIFIC PLAN FOR SOLEDAD MOUNTAIN - ELEPHANT BUTTE
PROPERTY BOUNDARY
R13W
R12W
T11N
T10N
TR3253
SEE ZONE 36 MAP 197-36
TR3207
TR3554
GOLDTOWN
28
27
26
25
33
34
35
A-1
A
PL RS
E(2 1/2) RS
E(5) RS
M-3
M-3 PD
AFP
RS
0
0.5
1
APPROXIMATE SCALE IN MILES
LEGEND
LOW DENSITY RESIDENTIAL (1 D.U. per 2.5 Acres)
MINERAL EXTRACTION AND PROCESSING
PUBLIC LANDS
A-1 LIMITED AGRICULTURE
AFP AGRICULTURE, FLOOD PLAIN
E (2 1/2) RS ESTATE (2 1/2 AC. MIN.), RESIDENTIAL SUBURBAN
AREA NOT INCLUDED
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Soledad Mountain Project
ZONING AND SPECIFIC PLAN LAND USE MAP
DATE 11/96
0733.0010
EXHIBIT 3.11-2

health, safety and welfare of future residents within the 'Goldtown' area, due to the scarcity and questionable quality of the water supply." The Townsite of Goldtown does not have paved streets, a potable water supply or sewer system. The Specific Plan states "With the exception of Goldtown, water supply within the Plan area will be by individual wells." At this time there is no alternative water supply to Goldtown.

The zoning district for each of the areas in which Golden Queen has acquired an interest is shown below:

Township 11 North, Range 12 West, SBBM

| | |
|---|---|
| Section 32 | A-1 (Limited Agriculture) |

Township 10 North, Range 12 West, SBBM

| | |
|---|---|
| Section 5 | A-1 (Limited Agriculture) |
| Section 6 | A-1 (Limited Agriculture) |
| Section 7 | A-1 (Limited Agriculture) |
| Section 8 | A-1 (Limited Agriculture) |
| Section 18 | A-1 (Limited Agriculture) |

Township 10 North, Range 13 West, SBBM

| | |
|---|---|
| Section 1 | E(2 1/2) RS (Estate & Residential Suburban Combining) |
| Section 12 | A (Exclusive Agriculture) |

Direct/Indirect Impacts - The proposed land use is permitted by existing zoning, therefore, no change in zoning is proposed. Impacts are **Less Than Significant**.

Irreversible/Irretrievable Commitment of Resources - There will be no irreversible or irretrievable commitment of resources related to zoning. No zoning changes are anticipated. The project will not prevent other types of land uses, such as residential, on adjacent properties. Agriculture is not considered feasible on the project site due to the lack of soil and the steep slopes. Commercial and industrial facilities are possible

in the area but would require a zone change and amendment to the Specific Plan. The Specific Plan for Soledad Mountain - Elephant Butte and Vicinity - South of Mojave does not propose any industry within the plan area other than mining and ore processing.

Cumulative Impacts - The zoning will not change and there are no cumulative impacts to zoning in the project area.

Recommended Mitigation - The mining activity will conform to the conditions and mitigation measures imposed by the Conditional Use Permit and approved Reclamation Plan.

Residual Impacts - There are no residual impacts to zoning.

### 3.11.2 General Plan

Setting - The majority of the project area lies within the "Specific Plan for Soledad Mountain - Elephant Butte and Vicinity - South of Mojave," which was adopted by the Board of Supervisors of the County of Kern, State of California by Resolution 73-278 and, subsequently, Resolution 73-485 was adopted by the Board of Supervisors on June 18, 1973 to correct clerical errors in the plan. The plan area for the Specific Plan is shown on Exhibit 3.11-2. A copy of the referenced Specific Plan is contained in Appendix I. The existing Specific Plan recognizes the mineral resources within the area. The plan states in part that "No industry is proposed within the Plan Area with the exception of mining and possible processing of silver and gold ores" and that "Those areas known to contain potential commercial value ores and deposits should be restricted from potential incompatible use and protected for their Beneficial future use." As shown in Exhibit 3.11-2, the majority of the land within Sections 5, 6, 7, and, 8, Township 10 North, Range 12 West, SBBM, contains a land use designation of "Mineral Extraction and Processing," on the Specific Plan. The remainder of the land in these sections contains land use designations of "Public Lands" and "Low Density Residential (1 D.U. per 2.5 acres). The project also includes a portion of Section 1, Township 10

North, Range 13 West, SBBM, which has a land use designation of Low Density Residential (1 D.U. per 2.5 acres).

Direct/Indirect Impacts - The project does not require a General Plan Amendment or Specific Plan Amendment. Golden Queen's mining pit, heap leach pads, crushing and precious metal recovery facilities will be within the boundary of the Specific Plan for Soledad Mountain - Elephant Butte and Vicinity - South of Mojave which recognizes the potential for mining in the area. Therefore, the Golden Queen project is compatible with the Specific Plan and the impacts are **Less Than Significant**.

Irreversible/Irretrievable Commitment of Resources - Neither the General Plan nor the Specific Plan will be amended and there is no irreversible/irretrievable commitment of resources related to the General Plan.

Cumulative Impacts - There are no cumulative impacts to the General Plan.

Recommended Mitigation - Impacts to the General Plan are less than significant and no mitigation measures are proposed.

Residual Impacts - Neither the General Plan nor the Specific Plan will be amended and there are no residual impacts to the General Plan.

### 3.11.3 Mineral Rights

Setting - The approximate 2,840 acre block of land controlled by Golden Queen is comprised of a combination of mineral rights that are included in the fee acreage, mining leases, patented mining claims and unpatented mining claims.

Shortly after becoming a state, California acquired title to land underlying navigable waterways and two square miles out of each township previously owned by the federal government. The state of California still retains an interest in approximately 1.3 million

acres of desert and forest lands that were acquired shortly after being admitted to the union. The state land is managed by the California State Lands Commission. Within the Golden Queen project area, the California State Lands Commission has a reserved 1/16 mineral interest in Lots 2 and 20 in Section 6, Township 10 North, Range 12 West, SBBM (Kern County Assessors Parcel numbers 429-190-4, 5 & 6).

The mineral interest of the State Lands Commission affects approximately 68 gross acres in the northeast quarter of Section 6. The reserved mineral interest entitles the state to a 1/16 royalty from minerals produced from this land. This portion of the project area will not be a part of the mine; therefore, no minerals are anticipated to be removed from land on which the State Lands Commission has an interest. The surface will be used for a heap leach pad, overburden piles or other activities related to mining. An opinion written by M. William Tilden, Esq, dated August 14, 1996, concerning the State Lands Commission's interest is contained in Appendix XIV. The letter indicates that the State Lands Commission is not concerned with the planned surface use of this property.

Direct/Indirect Impacts - Golden Queen has acquired or is in final negotiation for all necessary interests for the project. A complete list of the interests acquired for this project is contained in Appendix XIV. The consolidation of mining rights facilitates mineral mining in the area of acquisition. The impact of Golden Queen's acquisition of mineral rights is the consolidation to a single entity is **Less Than Significant**.

Irreversible/Irretrievable Commitment of Resources - There will be no irreversible or irretrievable commitment of resources related to mineral rights as a result of the proposed project.

Cumulative Impacts - There are no cumulative impacts to mineral rights as a result of the proposed project.

Recommended Mitigation - Impacts to mineral rights are beneficial and no mitigation measures are proposed.

Residual Impacts - The consolidation of mineral rights is a **Beneficial** residual impact.

### 3.11.4 Legal Restraints

Setting - The Specific Plan for Soledad Mountain - Elephant Butte and Vicinity - South of Mojave designates the land use for the Soledad Mountain project as, "mineral extraction and processing." All surface and mineral rights (with the exception of the State Lands Commission interest discussed in Section 3.11.3) have been obtained and are free and clear.

Access to the site is from Silver Queen Road, an existing, paved county road. Silver Queen Road is an east-west road which runs approximately 600 feet north of the project site. Golden Queen's entrance road will intersect Silver Queen Road near the eastern boundary of Section 6, Township 10 North, Range 12 West, SBBM, directly opposite Gold Town Road.

New Eagle Road, a dedicated county road, extends southerly from Silver Queen Road into the northwest 1/4 of Section 6, Township 10 North, Range 12 West, SBBM approximately 1,670 feet to its terminus at the base of Soledad Mountain.

Direct/Indirect Impacts - Golden Queen has acquired the legal right to mine for precious metals and other valuable products within the project area. The proposed project site is in a zoning district which allows mining subject to a Conditional Use Permit and Surface Mine Reclamation Plan. A Conditional Use Permit, Surface Mine Permit and approved Surface Mine Reclamation Plan will be obtained for the proposed project. The mining activity and subsequent reclamation will be subject to all conditions contained in the Conditional Use Permit, Reclamation Plan, BLM Operation Plan, and Regional Water Quality Control Board's Waste Discharge Requirements together with all other required permits.

Golden Queen has applied or is in the process of preparing applications for various permits required by local, state, and federal agencies. The permits will contain conditions to which Golden Queen must adhere during the life of the mining activity. The permit requirements are more fully discussed in Section 3.2.6 of this document. Impacts to legal restraints due to the Proposed Action are **Less Than Significant**.

Irreversible/Irretrievable Commitment of Resources - The existence of New Eagle Road as a public road prohibits Golden Queen from using the roadway for activities inconsistent with a public road. The portion of New Eagle Road within Section 6, Township 10 North, Range 12 West, SBBM will need to be vacated in order for Golden Queen to implement the proposed project as designed. The vacation of New Eagle Road will result in the permanent loss of approximately 1,670 feet of roadway. The road terminates in Section 6 and does not connect to any other public road or streets.

Cumulative Impacts - There are no cumulative impacts to legal restraints as a result of the proposed project.

Recommended Mitigation - It is recommended that Golden Queen seek the vacation of that portion of New Eagle Road within Section 6, Township 10 North, Range 12 West, SBBM, prior to commencing mining activity. Vacating the road will protect the public from inadvertent access and allow Golden Queen to use the area for mining activity.

Residual Impacts - There are no residual impacts to legal restraints as a result of the proposed project.

### 3.12 Recreation

Setting - The BLM manages the majority of the NW 1/4 and W 1/2 of the SW 1/6 of Section 6, Township 10 North, Range 12 West, SBBM. Other BLM properties in the vicinity of the Soledad Mountain Project consist of islands of land surrounded by private ownership. Most private owners have fenced, gated, or posted their lands restricting

access. There are no identified BLM routes for off-highway vehicles (OHV) in the project area. There is limited hiking on the BLM managed land and some unauthorized OHV use of the desert lands north and west of the project site. Hunting, shooting and other recreational uses are restricted in the project area by the private owners.

Direct/Indirect Impacts - The project will occupy 195 acres of public lands within the proposed disturbance area with no recreational value. The presence of the mining staff should discourage illegal abuse of the surrounding BLM and private lands. As there are little or no recreational uses for the project site and no impacts are anticipated as a result of the Proposed Action, impacts are considered **Less Than Significant**.

Irreversible/Irretrievable Commitment of Resources - The project will eliminate any possible recreational use on the land until mining has ceased and reclamation is complete.

Cumulative Impacts - No cumulative impacts are associated with the proposed project.

Recommended Mitigation - There are no impacts to the recreational resources as a result and no mitigation measures are proposed.

Residual Impacts - The land will be reclaimed at the conclusion of mining activities, therefore, post mining land use will be similar to pre-mining land use. There will be no residual impacts to recreation.

## 3.13 Socioeconomics

The project is expected to employ approximately 250 people during the construction phase, and up to 230 people during the operation of the facility. A majority of the full-time employees for the project are expected to be drawn from people who already live in the area. Many are expected to be former or current employees of other similar

operations in the county that have ceased operations or are in the process of ceasing operations.

Over the life of the project, up to 6 million tons of precious metals ore will be produced on an annual basis. It is also anticipated that a significant amount of the overburden materials removed in the mining process could be sold as aggregate and construction material.

Because of its location, the project will impact both Kern and Los Angeles Counties, and adjustments have been made in this analysis to reflect this situation. For the purposes of this study it has been assumed that approximately one-half of those employed by the project will live in Los Angeles County and will spend their disposable income where they live.

During the construction phase, expenditures for labor and materials would infuse approximately $13.7 million dollars into the regional economy. Two hundred and fifty construction workers would be employed, earning approximately $9.9 million dollars in wages. This economic activity would support an additional 166 workers with wages of $3.7 million.

The project will create an estimated 230 full-time jobs, which will pay $7.6 million dollars in wages, exclusive of benefits. The expenditures made by Golden Queen on goods, labor and other services will support another 136 jobs, which are expected to pay wages of $3.3 million. As shown in Table 3.13-1, the value added by the direct and indirect effects of this activity are forecast at $11 million.

**TABLE 3.13-1**
**Predicted Impacts to Regional Economy**
**(Millions of dollars)**

| | Employment | Wages | Value Added |
|---|---|---|---|
| Direct | 230 | $7.6 | $7.2 |
| Indirect | 136 | $3.3 | $3.8 |
| Total | 336 | $10.9 | $11.0 |

There are three groupings of residential areas near the proposed project area: (1) those adjacent to the project area along Silver Queen Road and Mojave-Tropico Road (e.g. those within roughly one-third to one-half mile, at the base of the mountain); (2) the community of Camelot 2.5 miles to the north, and (3) residents along the Backus Road corridor on the south side of Soledad Mountain. Mining and housing have been co-existing in the project area for the last ten years. Many homes were built and sold in the vicinity of the Standard Hill and Cactus mines after they started operations in 1987 and 1985, respectively. Standard Hill Mine commenced operations roughly the same time as the 109 Camelot homes were developed. Just north of Soledad Mountain off of Silver Queen Road, there are several homes which were constructed during mining operations at Standard Hill and Cactus.

During the 1980's, the economy of Southern California expanded at a rapid pace, as employment and population grew. This economic growth spurred dramatic price appreciation in residential property values in Los Angeles County. As a result, many home builders moved to the Antelope Valley to develop more affordable housing, and thousands of families moved into Palmdale and Lancaster, thereby increasing real estate values through the Antelope Valley. The defense and aerospace industries were major job providers throughout the region, and the Antelope Valley shared in this job growth, with employers such as Edwards Air Force Base and Lockheed Martin. However, the recession of the early to mid-1990's cost Southern California more than 350,000 jobs, and the Antelope Valley area was hard hit by the loss of jobs.

Between 1991 and 1994, Kern County is estimated to have lost 6,500 jobs (3.1%). These losses were partly attributable to a large number of job losses in defense and aerospace. Mineral resource employment in the County dropped by 3,900 jobs from 1984 to 1994, a 26.4% decline. Mineral resource's share of total employment in the County dropped from 8.5% in 1984 to 4.4% in 1994.

As home values decreased in the 1990's, the development of housing units slowed in both the Mojave and Rosamond areas. From 1990 to 1996, the average home prices

reported by TRW/REDI Property Data in the Mojave area decreased from $64,550 to $48,550. Over the same period, the reported sales average in the Rosamond area decreased from $98,740 to $78,740.

Direct/Indirect Impacts - A socioeconomic analysis of the proposed project has been performed by Weaver, Hawley, Mills Consultants and is attached as Appendix XV. This analysis represents a "snap shot in time". It was prepared at an early stage in the project scoping process. Some design parameters have undergone minor changes but these changes do not affect the conclusions of the analysis.

A proportion valuation approach was taken to determine the fiscal impact the project would likely have on the County of Kern. That analysis indicates tax receipts would exceed the expenditures for government services necessitated by the project by approximately $40,700 in Year 1. This assumes a contribution to the County General and Fire Funds of $57,224 and projected service costs of $16,500.

This analysis concludes that the project will substantially enhance the regional economy and is considered **Beneficial**. The project is not deemed growth inducing because the jobs created will, in all likelihood, replace those being eliminated by the closure of a similar facility within the area. Golden Queen anticipates hiring most, if not all, of its employees from that labor pool.

Sedway Kotin Mouchly Group was retained to evaluate the potential impact on values of residential properties in proximity to the proposed Soledad Mountain Project. The report is included in Appendix XV as an Addendum to the Socioeconomic Study. The study concluded residential property values in the Mojave/Rosamond area have experienced a downturn in prices due to a general economic depression in the area since 1990. Residential property values within a half-mile of the mining operations along Silver Queen/Mojave-Tropico Road may be impacted by the mining operation, however, there is insufficient data to anticipate the exact magnitude of the price reduction. There will not be a measurable impact on property values in the Camelot community located

approximately 2.5 miles north of the proposed project. The residences along the Backus Road corridor located to the south of Soledad Mountain will not experience any measurable value loss. The impacts to property values resulting from the proposed project are considered **Less Than Significant**.

Irreversible/Irretrievable Commitment of Resources - These is no irreversible/irretrievable commitment of government services.

Cumulative Impacts - The project is not growth inducing and there are no other major projects in the surrounding area, thus, there are no cumulative impacts.

Recommended Mitigation - There are no significant impacts, therefore, there are no recommended mitigation measures.

Residual Impacts - There are no significant impacts, therefore, there are no residual impacts.

### 3.14 Health Hazards/Public Safety

Setting - Currently there are only exploratory activities on the Golden Queen project site. Historical mining activity has resulted in intense site disturbance, including abandoned shafts and adits, accumulations of waste rock/low grade ore materials throughout the site, and non-mining wastes in the historical processing areas. There is no control over public access. A regulatory data search revealed no known contamination sites within 2,000 feet of the project area. The nearest residence is located approximately 1,100 feet north of the northern edge of the proposed heap leach pad.

The proposed project has been designed to eliminate offsite consequences from releases of hazardous materials and or waste based on review of the secondary containment structures and storage procedures. Training and emergency response procedures required through the Hazardous Materials Business Plan are incorporated

as a portion of the project design. The project has been designed as a "zero discharge" facility for storm water runoff.

Direct/Indirect Impacts - Impacts could consist of toxic or hazardous substances released in the environment (air, land or water). Particulate emissions result from the three phases of activity: construction, normal operations, and reclamation. Emissions resulting from these activities contain certain toxic air contaminants which will be released into the atmosphere. Sodium cyanide reactions in the heap leach will release a certain amount of cyanide into the atmosphere.

A health impact assessment of the effect of the proposed operations on the surrounding air quality was performed and is included in Appendix X. Golden Queen plans to perform some crushing and screening operations in order to properly size the ore going to the heap leach pad, however, the majority of the particulate emissions are fugitive emissions from sources including drilling, blasting, loading, hauling, unloading, dozing, and wind erosion. The quantification of particulate emissions detailed in Section 3.5-2 is used as a basis for determining the amount of air toxic emissions from each source. Concentrations were calculated at 20 specific receptors (identified as existing residences or groups of residences), at 70 locations along the property line, and at 367 gridded locations (arbitrary locations picked to help determine a maximum estimated impact).

The concentrations of each toxic compound were used to determine the maximum expected cancer risk for each location. The modeled output includes the concentration of each toxic compound in $\mu g/m^3$, receptor estimated total excess cancer risk, maximum acute exposure, and maximum chronic exposure. In addition, source and pollutant contributions to total excess cancer risk, maximum acute exposure, and maximum chronic exposure are estimated for specified locations.

The health impact assessment includes a multipathway analysis based on assumptions listed in the California Air Pollution Control Officers Association (CAPCOA) Guidelines revised October 1993. The determination of maximum offsite cancer risk, maximum

individual offsite cancer risk at an existing specific receptor, and the combined inhalation and non-inhalation risk are calculated for each gridded location. The inhalation risk is calculated by multiplying "ground level" concentrations of an air toxic by the air toxic-specific unit risk factor. The non-inhalation risk for each air toxic at a location is calculated by multiplying the average daily dose by the potency slope. The average daily dose of each substance was calculated using the results of the dispersion model (ISC3) and the multipathway exposure algorithms found in the CAPCOA Guidelines. The estimated risks for individual substances are then summed to provide the total excess cancer risk for the receptor locations.

The estimated risk values calculated herein are based on the ground level concentration of emissions at the specific locations. Due largely to the conservativeness of the assumptions inherent in the risk assessment procedures, the risk to actual residents living near the proposed facility may be less than the values indicated. The methods of calculating carcinogenic risk, hazard indices and cancer burden used here are based on a "worst-plausible" situation and are health-conservative in nature. They predict the upper limits of risk based upon the given emission rates. That is to say, the real risks are not likely to be any higher than the predicted numbers and may well be significantly less. This health-conservative approach to assessing risk is the one chosen by EPA, the California Office of Environmental Health Hazards Assessment (OEHHA), and CARB, and is used here for consistency with the concepts and basic assumptions utilized by the reviewing agencies. This comparison of estimated toxic emissions assumes continuous exposure to the maximum concentration of emissions for the entire life of the project. This method ignores the reduction in exposure realized by periods of time spent away from the residence on vacation, at work, or indoors.

Implementation of the Proposed Action would result in the emission of various air toxics, including naturally occurring metals from handling of the ore and overburden materials, hydrogen cyanide from the leaching solution, and organic gases and some metals from the gas-fired furnace and the mercury retort. The estimated excess cancer risk from the Proposed Action at any of the 20 specified receptors is $1.15 \times 10^{-6}$, or an additional

cancer risk of 1.15 per one (1) million population. This is a level which the KCAPCD defines as less than significant because it is less than 10 in one million. For comparison, in the general population of the United States the risk of developing cancer is approximately 1 in 3 (333,333 per one million population) and the risk of dying from cancer is 1 in 4 (250,000 per one million population). The cancer risk is driven primarily by arsenic and beryllium, which are naturally occurring components of the soil in the desert, particularly in areas where precious metals are found.

The maximum expected excess cancer risk from toxic air contaminants emitted from the project is $4.989 \times 10^{-6}$ (5 in one million). This is less than the significance level of ten (10) per one million. The maximum estimated short-term (acute) hazard index from exposure to toxic air contaminants from project emissions is 0.014. This is less than the significance level of 1.0. The maximum estimated long-term (chronic) hazard index from exposure to toxic air contaminants from project emissions is 0.052. This is less than the significance level of 1.0.

Golden Queen will analyze the particulate gathered at the proposed monitoring site to compare concentrations of toxic air contaminants with projected concentrations and maintain a program to reduce the increased risk from air toxics should it ever be shown that the risk exceeds the significance level. In addition, it is anticipated that this facility will prepare an Air Toxics Emissions Report (pursuant to AB2588) and possibly a health risk assessment if required by KCAPCD.

As a result of the natural degradation of sodium cyanide, hydrogen cyanide gas is generated as a by-product. As shown in the assessment results, the projected maximum one-hour concentration of hydrogen cyanide is 45.3 $\mu g/m^3$ (0.04 ppm) which is significantly less than the 10 ppm threshold limit/time-weighted average for a normal 8-hour work day established by the U. S. Occupation Safety and Health Administration for sustained breathing of gaseous hydrogen cyanide, and significantly less than the State of California 11 ppm threshold.

The Proposed Action will comply with all applicable federal, state and local laws, regulations and standards relating to hazardous materials. Hazardous materials transported to the site will be shipped in U. S. Department of Transportation (DOT) approved containers. There are no significant hazards to the public or the environment from foreseeable upset or accident conditions involving the release of hazardous materials.

Design and construction of the proposed project will incorporate all appropriate security and fire safety elements. A Hazardous Materials Business Plan will be prepared and retained onsite. Used oil and solvents will be collected and sent offsite for reprocessing by a licensed recycler. Storage of all hazardous materials will be in accordance with all federal, state and local regulations, codes, and rules.

Domestic waste water will be discharged to a septic system in accordance with Kern County Environmental Health Services Department approvals.

Sodium cyanide will be transported and handled in either briquette or liquid form. The cyanide leaching solutions will be maintained in a closed loop. The pregnant solution will be retained within the toe of the heap leach pad and the barren solution will be held in one or more tanks. The barren solution tank(s) will be adequately bermed to contain the maximum tank contents in the event of a catastrophic tank failure.

Onsite personnel will receive job specific training and annual refresher course training in emergency response procedures. Adequate access for emergency vehicles will be provided in all areas and fire hydrants will be located as required by the building code and the Kern County Fire Department. Site tours and site-specific training will be provided for local emergency services.

Fencing and other forms of perimeter control will be established to prohibit public access to the mine, heap leach pads and working areas. Most of the historical adits and shafts lie within the pit area. Those that are not removed by mining will be fenced to protect

the public but allow wildlife access or abandoned to prohibit access. The existing waste rock/low grade ore materials from historical mining activities within the project will be reclaimed. These protective measures will result in a **Beneficial** Impact.

Irreversible/Irretrievable Commitment of Resources - There is no irreversible or irretrievable commitment of public health or safety resources since, when the project is complete, there will be no further public health or safety concerns. The site will be reclaimed and no hazardous materials or waste will be present.

Cumulative Impacts - There are no significant impacts to public health or safety and there are no other major projects in the surrounding area, thus there are no cumulative impacts.

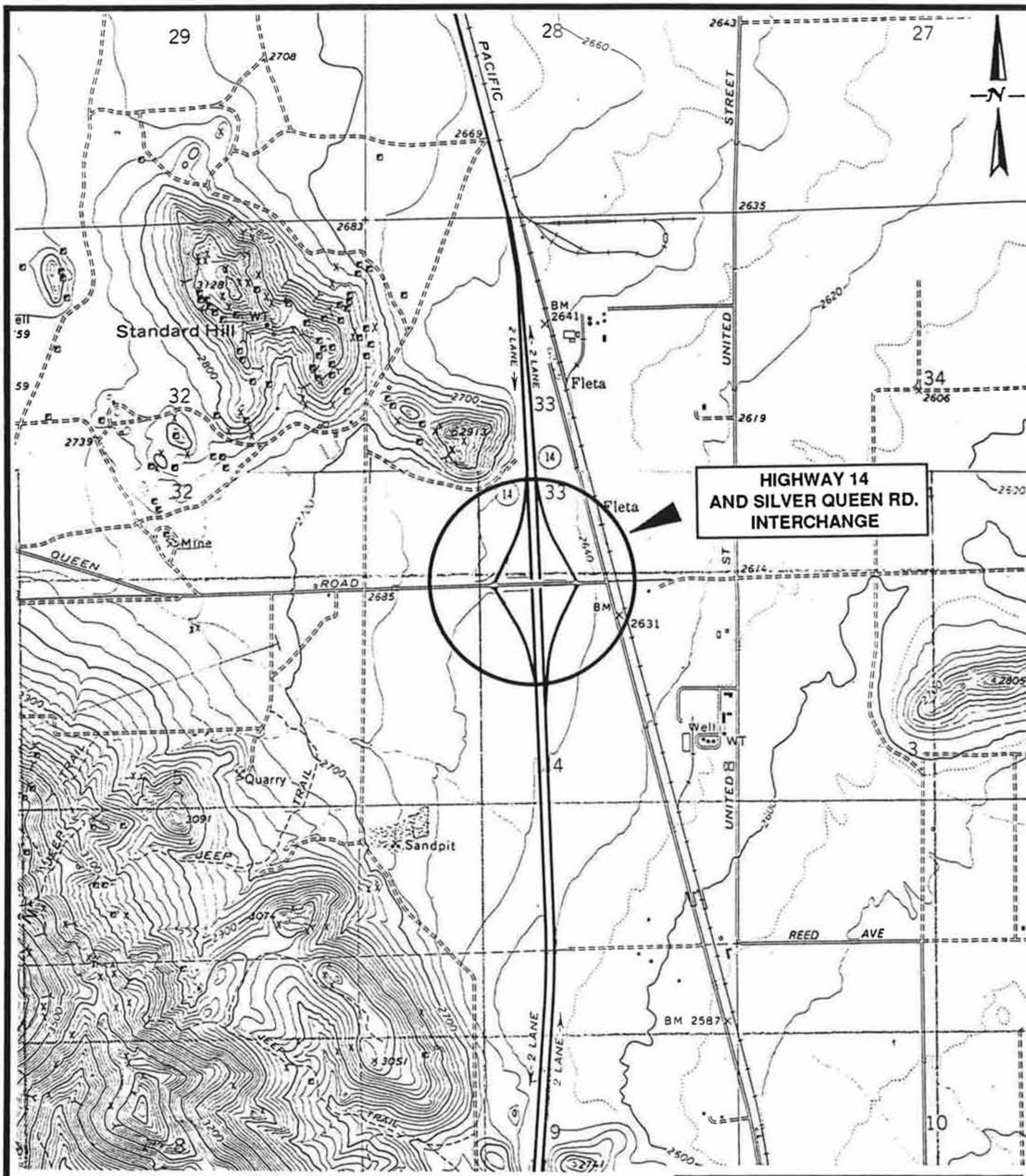
Recommended Mitigation - Since there are no significant impacts, there are no recommended mitigation measures.

Residual Impacts - Since there are no significant impacts, there are no residual impacts.

## 3.15 Traffic and Transportation

### 3.15.1 Existing Traffic and Parking

Setting - The project site is located on approximately 1,600 acres of undeveloped desert property approximately 1.5 miles southwest of the intersection of State Route 14 and Silver Queen Road. Silver Queen Road is a paved, two lane, county road. State Route 14 at Silver Queen Road is constructed to freeway standards with a full interchange (Exhibit 3.15-1). State Route 14 connects the Mojave area with the Los Angeles area. The 1995 level of traffic on State Route 14, south of State Route 58, was 15,000 average daily trips (ADT) with a corresponding Level of Service (LOS) of B according to the State of California Department of Transportation (Caltrans) traffic volumes reports.




0 2000' 4000'

SCALE IN FEET

REF: SOLEDAD & MOJAVE U.S.G.S
TOPOGRAPHIC QUADRANGLES

| | | |
|---|---|---|
| WZI INC. BAKERSFIELD, CALIFORNIA | | |
| GOLDEN QUEEN MINING COMPANY INC. Soledad Mountain Project | | |
| INTERCHANGE LOCATION MAP | | |
| DATE 11/96 | 0733.0010 | EXHIBIT 3.15-1 |

The traffic on State Route 14 is expected to increase by 3% annually for the next ten years and by 2% annually after that. The predicted ADT for the year 1997 is 15,915 and for the year 2010 is approximately 22,700. Caltrans expects the LOS to be D in the year 2010.

The 1995 Annual Traffic Census prepared by Kern County states that the ADT on Silver Queen Road is 410. The LOS on Silver Queen Road is A.

The project site is undeveloped and there is no established parking area onsite.

Direct/Indirect Impacts - The Kern County Planning Department has not identified any pending projects that will significantly affect traffic in the vicinity of the project. Therefore, no change is expected in Silver Queen Road other than the Golden Queen project. An increase in traffic due to the proposed project is expected to affect portions of State Route 14 and the portion of Silver Queen Road between the project site and State Route 14. The operation encompasses 1,600 acres providing sufficient area to accommodate all vehicles entering the site.

The facility is expected to employ approximately 250 workers during the construction phase. Approximately 200 trucks per month or 6.6 daily round trips (13 ADT) will deliver supplies to the project site during construction which is expected to take 9 to 12 months. Assuming ride sharing of 1.25 people per vehicle, the ADT could be increased by 400 during construction.

The total increase in traffic on Silver Queen Road during the construction phase of the project, including employees and delivery trucks, is 412 ADT or 100%. The current volume to capacity ratio of 0.03 will be increased by construction traffic to 0.054. This increase will not affect the LOS on Silver Queen Road and is therefore considered **Less Than Significant**.

The project is expected to employ 230 workers during the operating phase. During normal operation the facility will operate 24-hours per day. Approximately 100 trucks will deliver supplies to the site each month or about 3.3 daily round trips (7 ADT). Assuming that operations workers will ride share an average of 1.25 people per vehicle, the employee traffic on Silver Queen Road will increase by 368 ADT during operations.

The total increase in traffic from current use during operation of the mine, including employees and supply trucks is 375 ADT, an increase of 91% over the current 410 ADT. The capacity of Silver Queen Road is 15,000 ADT. The volume to capacity ratio will be increased from 0.03 to 0.05. This increase will not affect the LOS on Silver Queen Road and is therefore **Less Than Significant.**

The removal of overburden may result in material suitable for sale as aggregate. Aggregate sales may result in additional truck traffic of approximately 70 daily round trips (140 ADT). The traffic associated with the possible sale of aggregate together with traffic associated with operation of the mine will add 515 ADT to the current 410 ADT, an increase of 126% on Silver Queen Road. The capacity of Silver Queen Road is 15,000 ADT. The volume to capacity ratio would be increased to 0.06 and is, therefore, **Less Than Significant**.

The majority of the vehicles entering the mine will exit State Route 14 at the Silver Queen Road interchange and travel west on Silver Queen Road. It is assumed that 50% of the vehicle traffic related to the mine will travel south on State Route 14 and the other 50% will travel north to the Mojave and Tehachapi areas when leaving the mine site.

Assuming that 50% of the proposed project traffic goes north and 50% goes south from Silver Queen Road on State Route 14, the construction phase will increase the ADT on State Route 14 by 206 or 1.3% in the year 1997. The operations traffic will increase the ADT by approximately 258 or 1.7% in the year 1998. This increase will not increase the volume to capacity ratio enough to affect the LOS of State Route 14 and is therefore considered **Less Than Significant**.

The actual impact of the project during normal operations will be less than that stated because it is expected that 80% of the workforce will come from the current workforce in the area already traveling State Route 14 to and from work. Therefore the increase in ADT during the project operation would be increased by only 111 or approximately 0.7%.

By the year 2010, State Route 14 is projected to be at Level of Service F and the Golden Queen project will be in the final stages of reclamation, thereby creating a lesser impact than that described.

Silver Queen Road is a County road; therefore, it is maintained by Kern County. All County roads, including Silver Queen Road, are constructed to support truck traffic. Silver Queen Road is maintained to handle car and truck traffic. The project may result in the need for a slight increase in road maintenance on Silver Queen Road. However, any increase in maintenance costs is expected to be mitigated by increased taxes such as fuel tax and property tax. An analysis of fiscal impacts associated with this project is contained in Appendix XV of this document. The analysis indicates that the project is expected to generate a positive cash flow to Kern County by providing taxes in excess of costs that will be incurred for County services.

The Proposed Action will not result in a new violation, or exacerbate an existing violation, of an applicable legal standard or goal relating to traffic levels of service, or volume/capacity ratios, of a state or local agency. The Proposed Action will not conflict with any applicable congestion management plan, air quality plan, or other plan or policy relating to automobiles or transit systems. There will be adequate internal circulation capacity, including entrance and exit, to safely accommodate the average and peak-hour traffic loads. Impacts are considered **Less Than Significant**.

Irreversible/Irretrievable Commitment of Resources - There will be no irreversible or irretrievable commitment of resources related to traffic as a result of the Proposed Action. This project will not result in the need for additional public roads or

reconstruction of any existing public roads. This project is expected to last approximately 16 years; traffic solely associated with the project will be eliminated at the conclusion of the project.

Cumulative Impacts - There are no reasonably foreseeable projects in the area, therefore, there are no cumulative impacts to traffic related to this project.

Recommended Mitigation - Impacts to traffic are less than significant and no mitigation measures are proposed.

Residual Impacts - No residual impacts to traffic are anticipated from the Proposed Action.

### 3.15.2 Local Transit

Setting - The area is served by the Kern Regional Transit System which links California City, Mojave, Rosamond, Lancaster and Palmdale. Dial-a-Ride is also available for local transportation in the Mojave area.

Direct/Indirect Impacts - The local transit system is not anticipated to be affected by the mine because eighty percent of all employees already reside in the local area. Impact is considered to be **Less Than Significant**.

Irreversible/Irretrievable Commitment of Resources - There is no irreversible/irretrievable commitment of local transit resources. The project does not result in any anticipated changes to the local transit system.

Cumulative Impacts - There are no cumulative impacts to transit anticipated.

Recommended Mitigation - Impacts to transit are less than significant and no mitigation measures are proposed.

Residual Impacts - No residual impacts to transit are expected as a result of the Proposed Action.

### 3.15.3 Pedestrians

Setting - The facility will be located approximately 5 miles southwest of the town of Mojave on undeveloped desert property. Access to the mining site will be controlled to prevent inadvertent access by pedestrians.

Direct/Indirect Impacts - Since the project is in an undeveloped area, it is not subjected to pedestrian traffic. The mining activity is not expected to cause an increase in pedestrian traffic and the impact to pedestrians is considered **Less Than Significant**.

Irreversible/Irretrievable Commitment of Resources - There will be no irreversible or irretrievable commitment of resources related to pedestrians as a result of the project.

Cumulative Impacts - There are no anticipated cumulative impacts related to pedestrians as a result of the project.

Recommended Mitigation - There are no expected impacts related to pedestrians as a result of the Proposed Action and no mitigation measures are proposed.

Residual Impacts - No residual impacts related to pedestrians are expected.

# 4.0 ALTERNATIVES

Four alternatives to the Proposed Action have been evaluated for their environmental impacts and their impacts relative to those produced by the Proposed Action. The alternatives evaluated in this section are:

- No Action
- Increased Mining and Processing Rate
- Decreased Mining and Processing Rate
- Reduced Project Size

Of these, the No Action and the Reduced Project Size represent a change in the amount of land that would be disturbed relative to the Proposed Action. The potential impacts of these alternatives may vary from those of the Proposed Action in many of the resource areas evaluated.

The Increased Mining and Processing Rate and the Decreased Mining and Processing Rate alternatives do not change the overall size of the project from the Proposed Action relative to the land area disturbed or the amount of material mined and processed. Therefore, most of the impacts to resources will be the same as those of the Proposed Action.

None of the alternatives will have any impact, relative to the Proposed Action, upon several of the resources evaluated, including paleontological resources, land use, local transit, and pedestrians.

The potential environmental impacts of the Proposed Action and each of the alternatives is summarized in Table 4.0-1.

**TABLE 4.0-1**
**COMPARISON OF ENVIRONMENTAL IMPACTS OF PROJECT ALTERNATIVES**

| IMPACT FROM PROPOSED ACTION | DIFFERENCES IN ENVIRONMENTAL IMPACT AS COMPARED TO THE PROPOSED ACTION | | | |
|---|---|---|---|---|
| | No Action | Alternative Ore Beneficiation Rates | | Reduced Project Size |
| | | Increased Mining and Ore Processing Rate | Decreased Mining and Ore Processing Rate | |
| **MINERAL RESOURCES**<br>• The known minable minerals would be mined and processed.<br>• Development would promote further geologic and exploration work on the site. Positive impact on undiscovered minerals.<br>• Exploration anc mineral evaluation has been conducted at project facility locations.<br>• No loss of access to mineral resources.<br>• Overall impact to mineral resources: **Beneficial** | **MINERAL RESOURCES**<br>• The known mineral resource would not be recovered or utilized.<br>• No activities which would increase understanding of unknown minerals potential would occur, a negative impact relative to the Proposed Action.<br>• Overall impact to mineral resources: **Less Than Significant.** | **MINERAL RESOURCES**<br>• The known minable minerals would be mined and processed, but at a faster rate.<br>• No material change on unknown mineral resources from Proposed Action.<br>• Overall impact to mineral resources: **Beneficial** | **MINERAL RESOURCES**<br>• The known minable minerals would be mined and processed, but at a slower rate.<br>• No material change on unknown mineral resources from Proposed Action<br>• Overall impact to mineral resources: **Beneficial** | **MINERAL RESOURCES**<br>• Thirty percent of the foreseeable reserve would be mined and processed.<br>• Reduced exploration and development for undiscovered minerals, a negative impact relative to the Proposed Action.<br>• Overall impact to mineral resources: **Beneficial.** |
| **PHYSIOGRAPHY and GEOLOGY**<br>Topography<br>• A change in topography would occur due to creation of mines, heap leach piles, overburden piles, and mine facilities.<br>• Pre-existing disturbances would be reclaimed.<br>• Primary topographic high of Soledad Mountain would remain undisturbed. Major ridge lines would be disturbed, but not eliminated.<br>• Overall impact to existing topography: **Significant and Unavoidable.** | **PHYSIOGRAPHY and GEOLOGY**<br>Topography<br>• No change in current topography would occur.<br>• Pre-existing disturbances would not be reclaimed, a negative impact relative to the Proposed Action.<br>• Overall impact to existing topography: **Less Than Significant.** | **PHYSIOGRAPHY and GEOLOGY**<br>Topography<br>• The change in topography would occur at a faster rate.<br>• No material long term change from Proposed Action.<br>• Overall impact to existing topography: **Significant and Unavoidable** | **PHYSIOGRAPHY and GEOLOGY**<br>Topography<br>• The change in topography would occur at a slower rate.<br>• No material long term change from Proposed Action.<br>• Overall impact to existing topography: **Significant and Unavoidable** | **PHYSIOGRAPHY and GEOLOGY**<br>Topography<br>• A change in topography would occur, but not to significant ridges.<br>• Impact of other project facilities would be similar to Proposed Action<br>• Overall impact to existing topography: **Less Than Significant.** |

**TABLE 4.0-1**
**COMPARISON OF ENVIRONMENTAL IMPACTS OF PROJECT ALTERNATIVES**

<table>
<tr><th rowspan="3">IMPACT FROM PROPOSED ACTION</th><th colspan="4">DIFFERENCES IN ENVIRONMENTAL IMPACT AS COMPARED TO THE PROPOSED ACTION</th></tr>
<tr><th rowspan="2">No Action</th><th colspan="2">Alternative Ore Beneficiation Rates</th><th rowspan="2">Reduced Project Size</th></tr>
<tr><th>Increased Mining and Ore Processing Rate</th><th>Decreased Mining and Ore Processing Rate</th></tr>
<tr>
<td>PHYSIOGRAPHY and GEOLOGY<br>Seismic Hazards<br>• Design, engineering, and construction of project facilities would be in accordance with Zone 4 seismic requirements.<br>• Existing historical structures, features and facilities would be stabilized and/or eliminated.<br>• Overall impact to seismic hazards: Beneficial.</td>
<td>PHYSIOGRAPHY and GEOLOGY<br>Seismic Hazards<br>• No construction of facilities would occur.<br>• Existing hazards would not be eliminated or stabilized, a negative impact relative to the Proposed Action.<br>• Overall impact to seismic hazards: Less Than Significant.</td>
<td>PHYSIOGRAPHY and GEOLOGY<br>Seismic Hazards<br>• No material change from Proposed Action.<br>• Overall impact to seismic hazards: Beneficial.</td>
<td>PHYSIOGRAPHY and GEOLOGY<br>Seismic Hazards<br>• No material change from proposed action.<br>• Overall impact to seismic hazards: Beneficial.</td>
<td>PHYSIOGRAPHY and GEOLOGY<br>Seismic Hazards<br>• No material change from Proposed Action.<br>• Overall impact on seismic hazards: Beneficial.</td>
</tr>
<tr>
<td>SOILS<br>• Construction and operations would disturb two growth media soil types. Surface disturbance would be minimized.<br>• Disturbed soils suitable for growth media would be stockpiled and used in reclamation.<br>• Existing soils erosion would be controlled though implementation of grading plan.<br>• Overall impact to existing soils: Less Than Significant.</td>
<td>SOILS<br>• No new surface disturbance would occur.<br>• Current uncontrolled erosion patterns would continue,<br>• Overall impact to existing soils: Less Than Significant.</td>
<td>SOILS<br>• No material long term change from Proposed Action.<br>• Overall impact to existing soils: Less Than Significant.</td>
<td>SOILS<br>• No material long term change from proposed action.<br>• Overall impact to existing soils: Less Than Significant.</td>
<td>SOILS<br>• Less surface disturbance would occur.<br>• No material long term change from Proposed Action to erosion potential.<br>• Overall impact to existing soils: Less Than Significant.</td>
</tr>
<tr>
<td>HYDROLOGY<br>Surface Water<br>• Overburden would not be acid generating and would not release hazardous materials.<br>• Surface run-off would be controlled and contained.<br>• A zero water discharge facility would be constructed. No release would be made to surface water or groundwater.<br>• Overall impact to surface water: Less Than Significant.</td>
<td>HYDROLOGY<br>Surface Water<br>• Existing surface run-off would not be controlled and contained.<br>• Overall impact to surface water: Less Than Significant.</td>
<td>HYDROLOGY<br>Surface Water<br>• No material long term change from Proposed Action.<br>• Overall impact to surface water: Less Than Significant.</td>
<td>HYDROLOGY<br>Surface Water<br>• No material long term change from Proposed Action<br>• Overall impact to surface water: Less Than Significant.</td>
<td>HYDROLOGY<br>Surface Water<br>• No material long term change from Proposed Action other than shortened mine life.<br>• Overall impact to surface water: Less Than Significant.</td>
</tr>
</table>

**TABLE 4.0-1**
**COMPARISON OF ENVIRONMENTAL IMPACTS OF PROJECT ALTERNATIVES**

| IMPACT FROM PROPOSED ACTION | DIFFERENCES IN ENVIRONMENTAL IMPACT AS COMPARED TO THE PROPOSED ACTION | | | |
|---|---|---|---|---|
| | No Action | Alternative Ore Beneficiation Rates | | Reduced Project Size |
| | | Increased Mining and Ore Processing Rate | Decreased Mining and Ore Processing Rate | |
| **HYDROLOGY**<br>Groundwater/Water Supply<br>• Project water requirements would create localized drawdown of groundwater table. Area groundwater supplies would not be impacted.<br>• Long term water table level would not be significantly affected.<br>• Contingency bonding for unforeseen release event would be provided.<br>• Solution handling and leak detection facilities would protect against discharge to ground water. No effect on groundwater quality.<br>• Overall impact to groundwater/water supply: **Less Than Significant.** | **HYDROLOGY**<br>Groundwater/Water Supply<br>• No change in the amount or quality of water available would occur.<br>• New information would not be available on the local aquifer, a minor impact relative to the Proposed Action.<br>• Overall impact to groundwater/water supply: **Less Than Significant.** | **HYDROLOGY**<br>Groundwater/Water Supply<br>• Project pumping would create localized drawdown of water table at a faster rate than for the Proposed Action.<br>• Total water requirement over life of project will be less than for Proposed Action.<br>• Long term impact on water supply would be less than Proposed Action.<br>• Overall impact to groundwater/water supply: **Less Than Significant.** | **HYDROLOGY**<br>Groundwater/Water Supply<br>• Project pumping would create localized drawdown of water table at a slower rate than for the Proposed Action.<br>• Total water requirement over life of project will be greater than for Proposed Action.<br>• Long term impact on water supply would be greater than Proposed Action.<br>• Overall impact to groundwater/water supply: **Less Than Significant.** | **HYDROLOGY**<br>Groundwater/Water Supply<br>• Project pumping would create localized drawdown of water table at the same rate as the Proposed Action but for fewer years.<br>• Total water requirement over life of project would be less than for Proposed Action.<br>• Long term impact on water supply would be less than Proposed Action.<br>• Overall impact to groundwater/water supply: **Less Than Significant.** |
| **AIR QUALITY**<br>• Analysis of emissions potential indicates that air quality impacts would be within state and federal standards.<br>• Reclamation of existing tailings, mine waste and disturbed areas would reduce existing negative effect on air quality creating a beneficial impact.<br>• Overall impact to air quality: **Less Than Significant.** | **AIR QUALITY**<br>• No change in current air quality would occur.<br>• Existing uncontrolled dust generation would continue.<br>• Reclamation of pre-existing disturbances would not occur, a negative long term impact relative to the Proposed Action.<br>• Overall impact to air quality: **Less Than Significant.** | **AIR QUALITY**<br>• Modeling indicates that $PM_{10}$ air quality standards may be exceeded, which cannot be allowed.<br>• Disqualifies alternative from consideration<br>• Overall impact to air quality: **Significant and Unavoidable.** | **AIR QUALITY**<br>• Impacts to air quality would be less than Proposed Action.<br>• No material long term change from Proposed Action.<br>• Overall impact to air quality: **Less Than Significant.** | **AIR QUALITY**<br>• Project would impact air quality as in Proposed Action, but for a reduced period.<br>• No material long term change in air quality from Proposed Action.<br>• Overall impact to air quality: **Less Than Significant.** |

## TABLE 4.0-1
## COMPARISON OF ENVIRONMENTAL IMPACTS OF PROJECT ALTERNATIVES

| IMPACT FROM PROPOSED ACTION | DIFFERENCES IN ENVIRONMENTAL IMPACT AS COMPARED TO THE PROPOSED ACTION | | | |
|---|---|---|---|---|
| | No Action | Alternative Ore Beneficiation Rates | | Reduced Project Size |
| | | Increased Mining and Ore Processing Rate | Decreased Mining and Ore Processing Rate | |
| **BIOLOGICAL RESOURCES**<br>Vegetative Resources<br>• Little vegetation and no listed species are on the project site.<br>• Reclamation of pre-existing disturbances would be positive.<br>• Overall impact to vegetation: **Less Than Significant.** | **BIOLOGICAL RESOURCES**<br>Vegetative Resources<br>• No surface new surface disturbance affecting vegetation would occur.<br>• Proposed Action reclamation of pre-existing disturbances will not occur.<br>• Overall impact to vegetation: **Less Than Significant.** | **BIOLOGICAL RESOURCES**<br>Vegetative Resources<br>• No material long term change from Proposed Action.<br>• Overall impact to vegetation: **Less Than Significant.** | **BIOLOGICAL RESOURCES**<br>Vegetative Resources<br>• No material long term change from Proposed Action.<br>• Overall impact to vegetation: **Less Than Significant.** | **BIOLOGICAL RESOURCES**<br>Vegetative Resources<br>• Project activities will disturb less total surface and less total vegetation.<br>• Overall impact to vegetation: **Less Than Significant.** |
| **BIOLOGICAL RESOURCES**<br>Wildlife Resources<br>• Project activities would disturb wildlife on site. No listed species are on site.<br>• Reclamation of pre-existing disturbances would be positive.<br>• Overall impact to wildlife: **Less Than Significant.** | **BIOLOGICAL RESOURCES**<br>Wildlife Resources<br>• No surface new surface disturbance affecting wildlife will occur.<br>• Proposed Action reclamation of pre-existing disturbances will not occur.<br>• Overall impact to wildlife: **Less Than Significant.** | **BIOLOGICAL RESOURCES**<br>Wildlife Resources<br>• No material long term change from Proposed Action.<br>• Overall impact to wildlife: **Less Than Significant.** | **BIOLOGICAL RESOURCES**<br>Wildlife Resources<br>• No material long term change from Proposed Action.<br>• Overall impact to wildlife: **Less Than Significant.** | **BIOLOGICAL RESOURCES**<br>Wildlife Resources<br>• Project activities will disturb wildlife on site for a shorter period of time.<br>• Overall impact to wildlife **Less Than Significant.** |

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| IMPACT FROM PROPOSED ACTION | DIFFERENCES IN ENVIRONMENTAL IMPACT AS COMPARED TO THE PROPOSED ACTION | | | |
|---|---|---|---|---|
| | No Action | Alternative Ore Beneficiation Rates | | Reduced Project Size |
| | | Increased Mining and Ore Processing Rate | Decreased Mining and Ore Processing Rate | |
| **CULTURAL & HISTORICAL RESOURCES**<br>• Project activities would disturb four sites which have scientific and historical value.<br>• Data recovery would be conducted at these sites.<br>• Historic display and informational overlook would be created.<br>• Without the project, deterioration of resources will continue with no data recovery, representing a significant loss.<br>• Overall impact to cultural and historical resources: Project impact would be **Significant**, but reduced to **Less Than Significant** through mitigation efforts. Recordation of data due to the project results in an overall **Beneficial** impact. | **CULTURAL & HISTORICAL RESOURCES**<br>• No disturbance of sites with historical or scientific value will occur.<br>• No salvage or recording of data relating to these sites would occur, a negative impact relative to the Proposed Action.<br>• Current rate of deterioration would continue with loss of resource likely.<br>• Overall impact to cultural and historical resources: **Less Than Significant.** | **CULTURAL & HISTORICAL RESOURCES**<br>• No material long term change from Proposed Action.<br>• Overall impact to cultural and historical resources: **Beneficial** | **CULTURAL & HISTORICAL RESOURCES**<br>• No material long term change from Proposed Action.<br>• Overall impact to cultural and historical resources: **Beneficial.** | **CULTURAL & HISTORICAL RESOURCES**<br>• Project activities will disturb less total surface.<br>• Three of the four important sites will not be disturbed.<br>• Data recovery will be done assuring no loss of information.<br>• Overall impact to cultural and historical resources: **Less Than Significant** |

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|---|---|---|---|---|
| | No Action | Alternative Ore Beneficiation Rates | | Reduced Project Size |
| | | Increased Mining and Ore Processing Rate | Decreased Mining and Ore Processing Rate | |
| **PALEONTOLOGICAL RESOURCES**<br>• Fossils are not expected to be found due to site geology. Project would not create disturbance to a unique site.<br>• Overall impact to paleontological resources: **Less Than Significant.** | **PALEONTOLOGICAL RESOURCES**<br>• No new surface disturbance affecting potential paleontological resources will occur.<br>• Overall impact to paleonthological resources: **Less Than Significant.** | **PALEONTOLOGICAL RESOURCES**<br>• No material long term change from Proposed Action.<br>• Overall impact to paleontological resources: **Less Than Significant.** | **PALEONTOLOGICAL RESOURCES**<br>• No material long term change from Proposed Action.<br>• Overall impact to paleontological resources: **Less Than Significant.** | **PALEONTOLOGICAL RESOURCES**<br>• No material long term change from Proposed Action.<br>• Overall impact to paleontological resources: **Less Than Significant.** |
| **VISUAL RESOURCES**<br>• Project would have some visual impact.<br>• Viewed in relation to pre-existing and current conditions the contrast would be low.<br>• Due to viewing distance, viewer sensitivity would be low to moderate.<br>• Overall impact to visual resources: **Less Than Significant.** | **VISUAL RESOURCES**<br>• No change in visual resources would occur, except for reclamation of disturbances for which Golden Queen is responsible.<br>• Proposed Action reclamation of pre-existing disturbances would not occur, a negative impact relative to the Proposed Action<br>• Overall impact to visual resources: **Less Than Significant.** | **VISUAL RESOURCES**<br>• Rate of visual change would be faster, and time until reclamation is completed would be shorter.<br>• No material long term change from Proposed Action.<br>• Overall impact to visual resources: **Less Than Significant.** | **VISUAL RESOURCES**<br>• Rate of visual change would be slower and time until reclamation is completed would be longer.<br>• No material long term change from Proposed Action.<br>• Overall impact to visual resources: **Less Than Significant.** | **VISUAL RESOURCES**<br>• Visual impact reduced.<br>• Overburden piles are smaller, but retain same aspect as in Proposed Action.<br>• West heap leach pad is eliminated. North pad is smaller.<br>• Overall impact to visual resources: **Less Than Significant.** |
| **NOISE**<br>• Project would be in compliance with established regulations and standards.<br>• Overall impact to noise: **Less Than Significant.** | **NOISE**<br>• No change from existing conditions and noise sources would occur.<br>• Overall impact to noise: **Less Than Significant.** | **NOISE**<br>• Project generated noise would occur for a shorter period of time.<br>• Noise level would be increased slightly.<br>• No material long term change from Proposed Action.<br>• Overall impact to noise: **Less Than Significant.** | **NOISE**<br>• Project generated noise would extend for a longer period of time.<br>• Slight reduction in noise level.<br>• No material long term change from Proposed Action.<br>• Overall impact to noise: **Less Than Significant.** | **NOISE**<br>• Operating noise level the same as Proposed Action.<br>• Project generated noise would occur for a shorter period of time.<br>• Overall impact to noise: **Less Than Significant.** |

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|---|---|---|---|---|
| | No Action | Alternative Ore Beneficiation Rates | | Reduced Project Size |
| | | Increased Mining and Ore Processing Rate | Decreased Mining and Ore Processing Rate | |
| **LAND USE**<br>Zoning<br>• A Conditional Use Permit would be required.<br>• Project would be compatible with local zoning.<br>• Overall impact to zoning: **Less Than Significant.** | **LAND USE**<br>Zoning<br>• Area zoning would remain as is.<br>• Overall impact to zoning: **Less Than Significant.** | **LAND USE**<br>Zoning<br>• No material change from Proposed Action.<br>• Overall impact to zoning: **Less Than Significant.** | **LAND USE**<br>Zoning<br>• No material change from Proposed Action.<br>• Overall impact to zoning: **Less Than Significant.** | **LAND USE**<br>Zoning<br>• No material change from Proposed Action.<br>• Overall impact to zoning: **Less Than Significant.** |
| **LAND USE**<br>General Plan<br>• Project would not require a General Plan or Specific Plan amendment.<br>• Overall impact to general plan: **Less Than Significant.** | **LAND USE**<br>General Plan<br>• The General Plan would remain as is.<br>• Overall impact to general plan: **Less Than Significant.** | **LAND USE**<br>General Plan<br>• No material change from Proposed Action.<br>• Overall impact to general plan: **Less Than Significant.** | **LAND USE**<br>General Plan<br>• No material change from Proposed Action.<br>• Overall impact to general plan: **Less Than Significant.** | **LAND USE**<br>General Plan<br>• No material change from Proposed Action.<br>• Overall impact to general plan: **Less Than Significant.** |
| **LAND USE**<br>Mineral Rights<br>• Project would have mineral rights for all properties within the project area.<br>• Overall impact to mineral rights: **Less Than Significant** | **LAND USE**<br>Mineral Rights<br>• Golden Queen would retain the mineral rights currently held.<br>• Overall impact to mineral rights: **Less Than Significant.** | **LAND USE**<br>Mineral Rights<br>• No material change from Proposed Action.<br>• Overall impact to mineral rights: **Less Than Significant.** | **LAND USE**<br>Mineral Rights<br>• No material change from Proposed Action.<br>• Overall impact to mineral rights: **Less Than Significant.** | **LAND USE**<br>Mineral Rights<br>• No material change from Proposed Action.<br>• Overall impact to mineral rights: **Less Than Significant.** |
| **LAND USE**<br>Legal Restraints<br>• Project would have all permits and approvals for construction and operation.<br>• Overall impact on legal restraints: **Less Than Significant.** | **LAND USE**<br>Legal Restraints<br>• No change in legal restraints would occur.<br>• Overall impact on legal restraints: **Less Than Significant.** | **LAND USE**<br>Legal Restraints<br>• No material change from Proposed Action.<br>• Overall impact on legal restraints: **Less Than Significant.** | **LAND USE**<br>Legal Restraints<br>• No material change from Proposed Action.<br>• Overall impact on legal restraints: **Less Than Significant.** | **LAND USE**<br>Legal Restraints<br>• No material change from Proposed Action.<br>• Overall impact on legal restraints: **Less Than Significant.** |
| **RECREATION**<br>• Project would occupy public lands that currently have minor recreational value.<br>• Overall impact to recreation: **Less Than Significant.** | **RECREATION**<br>• Current minor recreational use, of public lands within the project site would continue.<br>• Overall impact to recreation: **Less Than Significant.** | **RECREATION**<br>• No material long term change from proposed action.<br>• Overall impact to recreation: **Less Than Significant.** | **RECREATION**<br>• No material long term change from Proposed Action.<br>• Overall impact to recreation: **Less Than Significant.** | **RECREATION**<br>• No material change from Proposed Action.<br>• Overall impact to recreation: **Less Than Significant.** |

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| IMPACT FROM PROPOSED ACTION | DIFFERENCES IN ENVIRONMENTAL IMPACT AS COMPARED TO THE PROPOSED ACTION | | | |
|---|---|---|---|---|
| | No Action | Alternative Ore Beneficiation Rates | | Reduced Project Size |
| | | Increased Mining and Ore Processing Rate | Decreased Mining and Ore Processing Rate | |
| **SOCIOECONOMICS**<br>• Project would provide 230 long term jobs and pay taxes for government services in excess of service requirements.<br>• Would create at least 136 indirect jobs.<br>• Would contribute at least $11.0 MM to economy annually.<br>• Overall impact to socioeconomics: **Beneficial.** | **SOCIOECONOMICS**<br>• Currently existing project related jobs and associated positive effects on the region would be eliminated.<br>• Potential for continued exploration and development of the resource may be diminished.<br>• With respect to the Proposed Action, the benefits of 230 jobs and related expenditures (more than $11.0 MM/year) would not occur.<br>• Overall impact to socioeconomics: **Less Than Significant.** | **SOCIOECONOMICS**<br>• Project would provide more jobs, but for a shorter period of time.<br>• Tax rates may be increased, but for a shorter period of time.<br>• Overall impact to socioeconomics: **Beneficial.** | **SOCIOECONOMICS**<br>• Project would provide fewer jobs, but for an extended period of time.<br>• Tax rates may be reduced.<br>• May adversely affect project development.<br>• Overall impact to socioeconomics: **Beneficial.** | **SOCIOECONOMICS**<br>• Project will provide the same number of primary and secondary jobs as Proposed Action, but for an shorter period of time.<br>• Property tax rates will be reduced due to decreased property value.<br>• Would likely put project feasibility and development in jeopardy.<br>• If the project is developed the overall impact to socioeconomics would remain: **Beneficial.** |
| **HEALTH HAZARDS/ PUBLIC SAFETY**<br>• Project would be permitted for and in compliance with all federal, state and local laws, standards, and regulations.<br>• Much of the existing health hazards (dust) would be reclaimed.<br>• Much of the public safety hazards (old mine openings and building, unstable slopes, tailings and waste dumps) would be eliminated and/or stabilized.<br>• Public access to unsafe areas would be controlled.<br>• Overall impact to health hazards and public safety: **Beneficial.** | **HEALTH HAZARDS/ PUBLIC SAFETY**<br>• No new potential health hazards or public safety hazards would occur.<br>• Public access to existing hazards would not be restricted.<br>• Existing hazards, particularly those associated with historic tailings, would not be remediated, a negative impact relative to the Proposed Action.<br>• Overall impact to health hazards and public safety: **Significant and Unavoidable.** | **HEALTH HAZARDS/ PUBLIC SAFETY**<br>• No material long term change from Proposed Action.<br>• Overall impact to health hazards and public safety: **Beneficial** | **HEALTH HAZARDS/ PUBLIC SAFETY**<br>• No material long term change from proposed action.<br>• Overall impact to health hazards and public safety: **Beneficial.** | **HEALTH HAZARDS/ PUBLIC SAFETY**<br>• Hazard and safety reduction activities will be similar to Proposed Action, but will have a reduced scale.<br>• Overall impact to health hazards and public safety: **Less Than Significant.** |

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|---|---|---|---|---|
| | No Action | Alternative Ore Beneficiation Rates | | Reduced Project Size |
| | | Increased Mining and Ore Processing Rate | Decreased Mining and Ore Processing Rate | |
| **TRAFFIC AND TRANSPORTATION**<br>Existing Traffic & Parking<br>• Average Daily Trips would increase on Silver Queen Road by 412 during construction and 368 during operation.<br>• Silver Queen Road volume to capacity ratio would increase from 0.03 to 0.05.<br>• Ample parking area would be available.<br>• Overall impact to traffic and parking: **Less Than Significant.** | **TRAFFIC AND TRANSPORTATION**<br>Existing Traffic & Parking<br>• Existing traffic patterns would not change.<br>• Overall impact to traffic and parking: **Less Than Significant.** | **TRAFFIC AND TRANSPORTATION**<br>Existing Traffic & Parking<br>• Average Daily Trips will increase on Silver Queen Road, but will occur for a shorter period of time.<br>• Road capacity to volume ratio would increase by 7% to about 0.06.<br>• No material long term change to traffic and parking from Proposed Action.<br>• Overall Impact to traffic and parking: **Less Than Significant.** | **TRAFFIC AND TRANSPORTATION**<br>Existing Traffic & Parking<br>• Average Daily Trips will decrease on Silver Queen Road, but will occur for a longer period of time.<br>• No material long term change from proposed action.<br>• Overall impact to traffic and parking: **Less Than Significant.** | **TRAFFIC AND TRANSPORTATION**<br>Existing Traffic & Parking<br>• No change in Average Daily Trips on Silver Queen Road from Proposed Action.<br>• No material long term change from Proposed Action.<br>• Overall impact to traffic and parking: **Less Than Significant** |
| **TRAFFIC AND TRANSPORTATION**<br>Local Transit<br>• Local transit would not be affected because most employees would be local residents.<br>• Overall impact to local transit: **Less Than Significant.** | **TRAFFIC AND TRANSPORTATION**<br>Local Transit<br>• Local transit would not be affected.<br>• Overall impact to local transit: **Less Than Significant.** | **TRAFFIC AND TRANSPORTATION**<br>Local Transit<br>• No material long term change to local transit from Proposed Action.<br>• Overall impact to local transit: **Less Than Significant.** | **TRAFFIC AND TRANSPORTATION**<br>Local Transit<br>• No material long term change to local transit from Proposed Action.<br>• Overall impact to local transit: **Less Than Significant.** | **TRAFFIC AND TRANSPORTATION**<br>Local Transit<br>• No material long term change to local transit from Proposed Action.<br>• Overall impact to local transit: **Less Than Transit.** |
| **TRAFFIC AND TRANSPORTATION**<br>Pedestrians<br>• Project would be in undeveloped area with little pedestrian traffic. Project would not cause increase.<br>• Overall impact to pedestrians: **Less Than Significant.** | **TRAFFIC AND TRANSPORTATION**<br>Pedestrians<br>• Project is in undeveloped area with little pedestrian traffic. No change in current conditions would occur.<br>• Overall impact to pedestrians: **Less Than Significant.** | **TRAFFIC AND TRANSPORTATION**<br>Pedestrians<br>• No material long term change to pedestrians from Proposed Action.<br>• Overall impact to pedestrians: **Less Than Significant.** | **TRAFFIC AND TRANSPORTATION**<br>Pedestrians<br>• No material long term change to pedestrians from Proposed Action.<br>• Overall impact to pedestrians: **Less Than Significant.** | **TRAFFIC AND TRANSPORTATION**<br>Pedestrians<br>• No material long term change to pedestrians from Proposed Action.<br>• Overall impact to pedestrians: **Less Than Significant.** |

## 4.1 No Action Alternative

### 4.1.1 Description of Alternative

Implementation of the No Action alternative would mean that the Soledad Mountain Project would not be developed as proposed or under any other alternative plan. Golden Queen's exploration disturbances at the site would be reclaimed and no potential for environmental impacts due to the Proposed Action would occur. Surface disturbances that have been created by historical, non-project related events would remain, and the present land uses would continue. The site would be available for future commercial gold processing proposals or for other proposals as permitted by BLM policy and County land use designations.

### 4.1.2 Environmental Analysis

#### 4.1.2.1 Mineral Resources

Federal mining laws encourage mineral development provided that appropriate attention is given to a long term balance between resource production, energy use, a healthy environment, natural resources conservation, and social needs. The No Action alternative would be generally inconsistent with federal and state policies encouraging mineral development if mining is proposed to be conducted in an environmentally responsible manner.

SMARA encourages the production of minerals while giving consideration to environmental resources. The Specific Plan for Soledad Mountain - Elephant Butte and Vicinity - South of Mojave recognizes gold and silver mining operations as important land uses. The protection of commercial value ores and deposits is incorporated into the plan through restriction of incompatible land uses.

In the No Action alternative, the existing mineral resources would remain as they are. There would be no increased access to or improved understanding of the potential for additional, currently unknown, mineral resources. There would be no beneficial use of the known mineral resource and the positive impacts created through utilization of this resource would not occur.

This alternative would not be an environmental improvement in comparison to the Proposed Action, which would be Beneficial. The environmental impact of the No Action alternative on existing mineral resources would be **Less Than Significant.**

#### 4.1.2.2 Physiography and Geology

##### 4.1.2.2.1 Topography

There would be no change to current topography except for reclamation by Golden Queen of surfaces disturbed by Golden Queen's exploration activities. Reclamation of pre-existing disturbance will not occur. This alternative would be environmentally positive in comparison to the Proposed Action. The environmental impact of the No Action alternative on existing topography would be **Less Than Significant.**

##### 4.1.2.2.2 Seismic Hazards

There would be no construction of buildings, facilities, or operating areas that could pose a risk due to seismic activity. Seismic hazards would continue to be present at their existing level. Hazards would continue to exist with old structures and mine openings that would otherwise be stabilized or eliminated by the Proposed Action.

Where the Proposed Action would produce a beneficial effect on these hazards, this alternative would have no effect. This alternative would constitute a negative environmental impact as compared to the Proposed Action. The environmental impact

of the No Action alternative on existing seismic hazards would be **Less Than Significant**.

#### 4.1.2.3 Soils

No new surface or soils disturbance would occur. Existing exploration disturbances associated with Golden Queen activities would be reclaimed by Golden Queen. Current losses of soils in areas of previous disturbance, due to wind and water erosion, would continue.

Relative to the Proposed Action, under which erosion would be controlled in these areas, this alternative would not be an environmental improvement. The environmental impact of the No Action alternative on existing soils would be **Less Than Significant**, the same as for the Proposed Action.

#### 4.1.2.4 Hydrology

##### 4.1.2.4.1 Surface Water

No changes from existing surface water flow patterns would occur. Storm water flows will continue to contact some waste materials from previous mining and development efforts and current erosion patterns will continue. The proposed redirection of surface water away from many of these areas will not occur.

This alternative would not be an environmental improvement with respect to the Proposed Action. The environmental impact of the No Action alternative on existing surface water would be **Less Than Significant,** the same as for the Proposed Action.

#### 4.1.2.4.2 Groundwater/Water Supply

There would be no change in the amount or quality of water withdrawn from the local groundwater supply. There would be no effect on the local groundwater level No new information would be developed from which a greater understanding of the aquifer in this region could be gained.

Since the environmental impact of the Proposed Action on groundwater/water supply would be Less Than Significant, this alternative would not be a significant improvement upon the environmental impact of the Proposed Action. The environmental impact of the No Action alternative on existing groundwater/water supply would be **Less Than Significant**, the same as for the Proposed Action.

#### 4.1.2.5 Air Quality

The project is located on a mountain in the Kern County portion of the southeast desert air basin. As such the weather conditions are hot and dry leading to the potential for wind erosion emissions from existing disturbed surfaces. There are approximately 215 acres of existing disturbed areas relating to past underground mining operations, including a large tailings pile on the northern flank of the mountain, which are subject to wind erosion emissions. The surface of the tailings pile consists of more finely textured material than will be exposed at the heap leach pads or the overburden piles proposed for this project. The current sources of air pollution would continue to exist if the proposed project is not enacted.

Under the Proposed Action, previously disturbed areas located within the project area will be removed as potential sources of air pollution either through reclamation or elimination by mining activity. The tailings pile is located where heap leach pad #1 will be built and is proposed as base material for the heap. This tailings pile is a large emissions generator when the wind speed exceeds the threshold velocity. On the same basis used to calculate emissions from the proposed project, it is estimated that the

disturbed acreage has annual emissions of 136,000 pounds of $PM_{10}$ per year. If the project is not developed these emissions may continue because there are no reclamation requirements for these past disturbances.

The net long term effect of the Proposed Action (from the end of the project and beyond) is that annual emissions from the project area would be decreased by 126,100 pounds of $PM_{10}$ per year resulting in long term beneficial impact to the air basin. Thus the long term effect of the No Action alternative is detrimental even though it may be considered **Less Than Significant**.

#### 4.1.2.6 Biology

##### 4.1.2.6.1 Vegetative Resources

No additional surface disturbance would occur. No reclamation of previously disturbed areas, other than those associated with Golden Queen development activities, would be done. The beneficial aspect of reclamation and revegetation of previously impacted areas would not be realized, resulting in a negative impact relative to the Proposed Action. The environmental impact of the No Action alternative on existing vegetative resources would be **Less Than Significant**, the same as for the Proposed Action.

##### 4.1.2.6.2 Wildlife Resources

No additional habitat disturbance would occur. Existing wildlife, of which there is little, would not be disturbed. No reclamation of previously disturbed habitat would occur, other than that associated with Golden Queen's development activities. The beneficial aspect of reclamation of previously disturbed areas would not be realized, a negative impact relative to the Proposed Action. The environmental impact of the No Action alternative on existing wildlife would be **Less Than Significant**, the same as for the Proposed Action.

#### 4.1.2.7 Cultural and Historical Resources

There would be no change in the status of the existing structural remains, surficial and subsurface deposits, shafts and adits, or other historical sites. No salvage excavation and recording of data would occur and there would be no erection of an informational display concerning historical mining activities on the site and in surrounding areas, as would be done in the Proposed Action. The present rate of deterioration of the resources would continue until the significance of the sites is lost.

This alternative would have a negative impact as compared to the Proposed Action, which has a beneficial residual impact upon these resources. The environmental impact of the No Action alternative on existing cultural and historical resources would be **Less Than Significant.**

#### 4.1.2.8 Paleontological Resources

There is no expectation that there are fossils in the project site. This alternative would not have any effect upon paleontological resources. The environmental impact of the No Action alternative on existing paleontological resources would be **Less Than Significant,** the same as for the Proposed Action.

#### 4.1.2.9 Visual Resources

There would be no change in the current visual impact of the project site to either residents or passers-by. The existing historical mine disturbance would not be reclaimed. The environmental impact of the No Action alternative on existing visual resources would be **Less Than Significant**, the same as for the Proposed Action.

#### 4.1.2.10 Noise

There would be no change to the current noise level at the project site. This alternative would be environmentally positive as compared to the Proposed Action. The environmental impact of the No Action alternative on existing noise would be **Less Than Significant**, the same as for the Proposed Action, since both scenarios would meet County noise requirements.

#### 4.1.2.11 Land Use

##### 4.1.2.11.1 Zoning

No change in zoning would be required for this alternative or for the Proposed Action. The environmental impact of the No Action alternative on existing zoning would be **Less Than Significant**, the same as for the Proposed Action.

##### 4.1.2.11.2 General Plan

Neither this alternative nor the Proposed Action require General Plan or Specific Plan amendments. The environmental impact of the No Action alternative on the existing General Plan and Specific Plan would be **Less Than Significant**, the same as for the Proposed Action.

##### 4.1.2.11.3 Mineral Rights

Golden Queen would continue to control the mineral rights it has acquired for project development. Other mineral rights associated with the area would be unaffected. This alternative would have no impact as compared to the Proposed Action. The environmental impact of the No Action alternative on the existing mineral rights would be **Less Than Significant**, the same as for the Proposed Action.

#### 4.1.2.11.4 Legal Restraints

There would be no change in the legal restraints that now exist at the project site. The environmental impact of the No Action alternative on the legal restraints would be **Less Than Significant**, the same as for the Proposed Action.

### 4.1.2.12 Recreation

There is virtually no current recreational use of the site. This alternative would have very little positive environmental impact as compared to the Proposed Action. The environmental impact of the No Action alternative on existing recreation would be **Less Than Significant,** the same as for the Proposed Action.

### 4.1.2.13 Socioeconomics

The No Action alternative would create no new jobs at the project site or within the region and would eliminate most of those that currently exist.

Relative to the Proposed Action, the creation of 250 short term construction jobs and an estimated 230 long term operating jobs would not occur. The annual value added to the regional economy of $11.0 million would not occur. Tax contributions to the County of Kern would not occur. The overall beneficial effect of the project would be foregone.

If the No Action alternative were to be chosen, it may reduce the interest of minerals companies in the site and may discourage, at least for the short term, minerals exploration and evaluation at the site and within the local area.

This alternative would have a negative socioeconomic impact as compared to the Beneficial effect of the Proposed Action. The impact of the No Action alternative on existing socioeconomics would result in little or no change to the existing socioeconomic environment, and would be considered **Less Than Significant**.

#### 4.1.2.14 Health Hazards/Public Safety

With the No Action alternative there would be no change in any of the current health/safety hazards that may exist on the site, which include particulate matter generation, old mine openings and deteriorating mine structures. The No Action alternative would result in the loss of the site control Golden Queen currently exercises over access to these hazards. This could negatively impact public safety. Air contaminants associated with the existing tailings pile will still be emitted.

With respect to the Proposed Action, any health or safety hazards presented by existing conditions that would be remedied by the Proposed Action would not occur, including demolition of unsafe structures, removal and/or reclamation of tailings and waste, demolition of unsafe mine openings, and stabilization of unsafe slopes.

This alternative would not be an environmental improvement as compared to the effect of the Proposed Action. The environmental impact of the No Action alternative on existing health hazards/public safety would be **Significant and Unavoidable.**

#### 4.1.2.15 Traffic and Transportation

##### 4.1.2.15.1 Existing Traffic and Parking

Since there would be no additional employment with this alternative, the No Action alternative would not affect existing traffic and parking. It would have a positive environmental impact as compared to the Proposed Action. The environmental impact of the No Action alternative on existing traffic and transportation would be **Less Than Significant**, the same as for the Proposed Action.

#### 4.1.2.15.2 Local Transit

The No Action alternative would have no effect on the local transit system. As proposed, the project would not affect local transit because it is expected that most employees would live in the local area. The environmental impact of the No Action alternative on existing local transit would be **Less Than Significant**, the same as for the Proposed Action.

#### 4.1.2.15.3 Pedestrians

The project is in an undeveloped area. Significant pedestrian traffic does not exist and neither the Proposed Action nor this alternative is expected to affect the area's use by pedestrians. This alternative would have no environmental effect in comparison to the Proposed Action. The environmental impact of the No Action alternative on existing pedestrians would be **Less Than Significant**, the same as for the Proposed Action.

### 4.1.3 Status of Alternative

The No Action alternative is technically feasible, but is not a superior alternative, in terms of overall environmental impact, to the Proposed Action as described below. The No Action alternative would have less impact on topography and visual resources, however, the Proposed Action would be superior with regard to mineral resources, seismic hazards, long term air quality, cultural and historical resources, socioeconomics, and health hazards and public safety. In addition, the Proposed Action will result in the reclamation of approximately 215 acres within the project area disturbed by historical mining activity.

The No Action alternative also would not be consistent with federal and state policies encouraging mineral development or with the Specific Plan for Soledad Mountain - Elephant Butte and Vicinity - South of Mojave, which recognizes gold and silver mining operations as important land uses.

## 4.2 Increased Mining and Processing Rate

### 4.2.1 Description of Alternative

This section describes a project alternative based upon increasing the planned ore mining and processing rate from 6 millions tons per year in the Proposed Action to an annual rate of 7.2 million tons per year. It may also result in increasing the total amount of material mined (ore plus overburden) to 36 million tons per year, which will decrease total project life from 10 years to 8 years. This alternative provides a basis for comparing the environmental impacts that could result from a change in project rate as well as project duration.

For purposes of analysis, the following assumptions are made regarding the increased mining and ore processing rate alternative:

- Total ore and overburden tons mined would be the same as for the Proposed Action, but the annual mining and ore processing rate would be increased by 20% as compared to the Proposed Action, thereby decreasing the operational life of the project by 17% (approximately two years).

- Surface disturbance and the site layout for this alternative would be the same as in the Proposed Action. Excavation of the same total tonnage of ore and overburden would require the same mine, overburden stockpile, and heap leach pad configurations. Disturbances for onsite roads and ancillary facilities would be similar, if not identical, because the same basic transportation needs, site access needs, and support activities would occur. While individual buildings or pieces of equipment may be larger, for example, a larger crushing circuit might be used, differences in disturbances would be negligible.

The changes in environmental impact that may occur due to an increased ore mining and processing rate are primarily related to the duration of mining activities, air quality, and the consumptive uses associated with project operation.

### 4.2.2 Environmental Analysis

The following environmental resources associated with the increased mining and processing rate alternatives have the same impacts as the Proposed Action as discussed in Section 3.0 and summarized in Table 4.0-1:

| | |
|---|---|
| Mineral Resources | Section 3.1 |
| Physiography and Geology | Section 3.2 |
| Soils | Section 3.3 |
| Biological Resources | Section 3.6 |
| Cultural and Historical Resources | Section 3.7 |
| Paleotological Resources | Section 3.8 |
| Visual Resources | Section 3.9 |
| Land Use | Section 3.11 |
| Recreation | Section 3.12 |
| Traffic and Transportation | Section 3.15 (Local Transit and Pedestrians) |

Only the resources which are affected by the alternative are discussed below.

#### 4.2.2.1 Hydrology

##### 4.2.2.1.1 Surface Water

This alternative would have a minor favorable environmental impact on surface water as compared to the Proposed Action. The same grading and drainage patterns would be used in either case. Erosion potential and contact of surface waters with overburden

piles would be similar, except, due to the rate of project development and overburden deposition, the period of time for surface water contact with unreclaimed materials would be less for the alternative. Given that the project site materials have been shown to not have acid generation potential and an approved grading plan would be utilized, the impact upon the environment of the increased mining and processing rate alternative would be **Less Than Significant**, the same as for the Proposed Action.

#### 4.2.2.1.2 Groundwater/Water Supply

The rate at which groundwater is required for the project and the total amount of water required over the life of the project varies according to the rate at which ore is mined and processed. Water requirements for the agglomeration and leaching processes vary in direct proportion to quantity of ore processed. Water used for dust control on roads and within the crushing process is more closely related to the number of operating hours required. The increased rate alternative would require that water be pumped from wells at a higher rate, but for a shorter length of time. The overall requirement for water over the life of the project would be about 8% less than the Proposed Action.

The estimated well pumping rate for this alternative is 825 gallons per minute over a project life of 8.33 years. The maximum projected drawdown at the water supply wells would be 90 feet which is 9% greater than the maximum drawdown projected under the Proposed Action, a negative short term impact. The drawdown analysis is included in the Hydrology Study (Appendix VIII). Its long term environmental impact on the existing groundwater/water supply environment relative to the Proposed Action would be positive but **Less Than Significant**.

Both the Proposed Action and the alternative would use the same design, construction and monitoring technology for the control of a potential release of contaminants to groundwater. There would be no differential effect upon the groundwater quality as a result of the process rate.

This alternative would have a minor favorable environmental impact on groundwater/water supply as compared to the Proposed Action. Overall, the environmental impact of the increased mining and processing rate alternative on existing groundwater/water supply would be **Less Than Significant**, the same as for the Proposed Action.

#### 4.2.2.2 Air Quality

Under this scenario, mining and processing rates would increase by 20%, resulting in increased $PM_{10}$ emissions, but for a shorter time period than the Proposed Action. A review of the $PM_{10}$ emissions sources was made to determine which sources would increase and which would remain the same as in the Proposed Action. For calculation of the 24-hour $PM_{10}$ concentration, the blasting and wind erosion sources will remain the same as in the Proposed Action. Blasting would only occur once per day but on more days than in the Proposed Action. Wind erosion is based on the surface area of exposed overburden piles, which would be similar to the Proposed Action. Emissions from all other sources would increase by approximately 20% from the increased activity.

For the dispersion model prepared for the Proposed Action, the individual sources were evaluated for their contribution to the maximum impact. A sensitivity analysis was conducted by scaling the appropriate variable sources by 20% and keeping the unaffected sources unchanged to estimate the impact of the increase in production rate on the maximum calculated $PM_{10}$ concentration. The $PM_{10}$ emission calculations assume the use of Best Available Control Technology for all required sources, including roads and equipment, similar to the Proposed Action. The sensitivity analysis is included in Appendix X with the air modeling for the Proposed Action. The estimated 24-hour $PM_{10}$ concentration resulting from the increased processing is a maximum of 50.13 $\mu g/m^3$, which exceeds the California 24-hour standard of 50 $\mu g/m^3$.

As part of the Proposed Action, meteorological and $PM_{10}$ monitoring will be established to show compliance with ambient air quality standards. It may be possible, through onsite data collection, to show that the dispersion modeling overestimates the maximum concentration, thus allowing an increased mining and processing rate. However, the estimated maximum 24-hour $PM_{10}$ emissions preclude obtaining an air permit for the increased rate alternative at this time.

The environmental impact to existing air quality of this alternative is **Significant and Unavoidable** at this time, given current Best Available Control Technology and estimated emissions.

#### 4.2.2.3 Noise

The noise generated by this alternative would be related to the mining and processing rate and the effect the rates have on the length of the project. During operations, the primary difference between this alternative and the Proposed Action would be the amount of material blasted, the size and amount of mining equipment needed, and the size and amount of the crushing/screening facility equipment.

For the increased production rate alternative, the present schedule of one blast per day, an average of five days per week, may be increased to blasting six to seven days per week. This would result in no change in the noise generated by blasting on a daily basis.

This alternative would either use more pieces of mining equipment similar in size to that used in the Proposed Action, or it would use a similar number of pieces of larger size equipment. The equipment would be run 24-hours per day, the same as the Proposed Action. If more equipment is used, it would likely add six significant pieces of equipment to the mining fleet. Due to the use of mufflers, the size of the mining equipment used in either case would have little effect on the noise generated.

The crushing facilities would produce somewhat more noise than the Proposed Action, but not in proportion to the production rates. It is expected that a larger jaw crusher, one cone crusher, one impact crusher and one screen would be added to the equipment needed for the Proposed Action.

The increased rate alternative would result in the generation of more noise, but over a shorter project life. For this alternative, and for the Proposed Action, noise generated would meet County requirements. The level of increase in the noise generated should be small and offset somewhat by the resultant shorter project life. It is estimated that a 20% increase in equipment will result in an increase in overall noise of approximately 1 to 2 dB at the sensitve receptors.

Given the distance from residences, the ambient area noise, and the requirement that the alternative must conform to the County noise regulations, the impact of this alternative on existing noise would be **Less Than Significant**, the same as for the Proposed Action.

#### 4.2.2.4 Socioeconomics

The effect of the increased production rate alternative on construction expenditures would be an increase in equipment expenditures due to the increased size and/or amount of equipment required. Construction employment and duration would be about the same as in the Proposed Action.

During the operating life of the project employment would be about 245, or 7% more than for the Proposed Action. Total wages and operating expenditures would be increased on an annual basis, providing a beneficial annual effect, but would occur for about two fewer years.

Total property taxes would not change significantly because the same resource would be mined. Other use taxes would likely increase, but be paid for a shorter time. With an eight to nine year project life, the effect upon property values would likely be similar to the effect of the Proposed Action.

This alternative would have a similar environmental impact on socioeconomics as compared to the Proposed Action. The reduced project life would result in greater short term benefits but less economic stability as compared to the Proposed Action. The environmental impact of the increased ore mining and processing rate alternative on existing socioeconomics would be **Beneficial**, the same as for the Proposed Action.

#### 4.2.2.5 Health Hazards/Public Safety

A sensitivity analysis was conducted on the incremental excess health risk from toxic air contaminants in the Proposed Action to evaluate any changes resulting from the increased mining and processing rate alternative. The results are included with the air modeling for the Proposed Action (Appendix X). The increased mining and processing rate is not designed as a larger project. It is the same project completed in a shorter time period.

Incremental health risk is based on the project life as well as the amount of particulate emissions. For all sources except wind erosion, the total emissions from the project will not change in the accelerated rate scenario, thus the incremental risk from these sources will be the same as in the Proposed Action. Wind erosion emissions are based on the surface area of the overburden piles exposed for a certain time period. Since the increased processing rate alternative will have a 17% shorter life, wind erosion emissions and their contribution to the total risk will be reduced by approximately 17%. Wind erosion emissions represent approximately 9.8% of the risk at the maximum exposed location. Reducing the project life by 17% will reduce the overall health risk from the project by about 1.7% to $4.9 \times 10^{-6}$ from $5.0 \times 10^{-6}$ for the Proposed Action. These

results are essentially the same within the accuracy of the emissions estimates and the air dispersion model.

Due to the increased scale of the operation, more reagents, chemicals, and other supplies would be delivered to and stored at the project site. This would create a slight increase in exposure potential relative to the Proposed Action. However, spill prevention and containment design and planning would accommodate increased shipments and storage, therefore the effect would be insignificant.

As in the Proposed Action, this alternative would eliminate and/or reduce access to many of the existing hazards to public safety posed by untended and deteriorating mine openings and structures.

This alternative would also produce the long term beneficial effect of stabilizing dust borne emissions from historical tailings and waste piles, as would the Proposed Action.

Overall, the environmental impact of health hazards and public safety of this alternative would be the same as for the Proposed Action, **Beneficial**.

#### 4.2.2.6 Traffic and Transportation

##### 4.2.2.6.1 Existing Traffic and Parking

The primary effect on traffic and parking of the increased production rate alternative would be by the number of employees working at the site. Fifteen more employees than in the Proposed Action would result in more traffic and the need for more parking. The project site has sufficient area to provide ample parking. The increased scale of operations would increase deliveries of supplies by up to 20%, an increase of one or two trips per day.

With these increases, the net result would be 28 additional ADT's spread over a twenty-four hour period. Given that the Proposed Action volume to capacity ratio for Silver Queen Road is 0.05, this additional traffic would raise it about 0.002, a negligible effect.

The environmental impact of the increased ore mining and processing rate alternative on existing traffic and parking would be **Less Than Significant**, the same as for the Proposed Action.

#### 4.2.3 Status of Alternative

This alternative examines the environmental effects of an increased rate of mining and ore processing relative to the Proposed Action. The increased rate alternative is technically feasible in all respects except for its anticipated effect upon the $PM_{10}$ portion of air quality. Air quality modeling has indicated that $PM_{10}$ standards would be exceeded by this alternative. This cannot be permitted without additional mitigation or collection of actual air emission data during operations. Therefore, the increased rate alternative cannot be considered as a viable alternative and should be eliminated from consideration.

If operational air quality monitoring should indicate that the results of pre-operational modeling were not indicative of actual conditions, consideration of increased rates should not be precluded.

### 4.3 Decreased Mining and Processing Rate

#### 4.3.1 Description of Alternative

This section describes a project alternative based upon decreasing the planned ore mining and processing rate from 6 million tons per year in the Proposed Action to an annual rate of 4.8 million tons per year. This may also result in a decrease of the total amount of material (ore plus overburden) mined per year to 24 million tons. This

alternative provides a basis for comparing the environmental impacts that could result from a change in project scale as well as project duration.

For purposes of analysis, the following assumptions are made regarding the decreased mining and ore processing rate alternative:

- Total ore and overburden tons mined would be the same as estimated for the Proposed Action, but the annual mining and ore processing rate would be decreased by 20% as compared to the Proposed Action, thereby increasing the operational life of the project by 25% (approximately two to three years).

- Surface disturbance and the site layout for this alternative would be the same as for the Proposed Action. Excavation of the same total tonnage of ore and overburden would require the same mine, overburden stockpile, and heap leach pad configurations. Disturbances for onsite roads and ancillary facilities would be similar, if not identical, because the same basic transportation needs, site access needs, and supporting activities would occur. While individual buildings or pieces of equipment may be smaller, for example, a smaller crushing circuit might be used, differences in disturbances would be negligible.

The changes in environmental impact that may occur due to a decreased mining and processing rate are primarily related to the duration of mining activities and the consumptive uses associated with project operation.

### 4.3.2 Environmental Analysis

The following environmental resources associated with the decreased mining and processing rate alternative have the same impacts as the Proposed Action as discussed in Section 3.0 and summarized in Table 4.0-1:

| | |
|---|---|
| Mineral Resources | Section 3.1 |
| Physiography and Geology | Section 3.2 |
| Soils | Section 3.3 |
| Biological Resources | Section 3.6 |
| Cultural and Historical Resources | Section 3.7 |
| Paleontological Resources | Section 3.8 |
| Visual Resources | Section 3.9 |
| Land Use | Section 3.11 |
| Recreation | Section 3.12 |
| Traffic and Transportation | Section 3.15 (Local Transit and Pedestrians) |

Only the resources affected by the alternative are discussed below.

#### 4.3.2.1 Hydrology

##### 4.3.2.1.1 Surface Water

The decreased production rate alternative and the Proposed Action would both have negligible impacts upon surface water hydrology. The same grading and drainage patterns would be used in either case. Erosion potential and contact of surface waters with overburden piles would be similar, except in the alternative, due to the rate of project development and overburden deposition, the period of time for contact with unreclaimed materials would be increased. Given that the project site materials have been shown to not have acid generation potential and an approved grading plan would

be utilized, the environmental impact of the decreased mining and processing rate alternative on existing surface water would be **Less Than Significant**, the same as for the Proposed Action.

#### 4.3.2.1.2 Groundwater/Water Supply

The rate at which groundwater is required for the project and the total amount of water required over the life of the project will vary according to the rate at which the project ore is mined and processed. Water requirements for the agglomeration and leaching processes vary in direct proportion with the quantity of ore processed. Water used for dust control on roads and within the crushing process is more closely related to the number of operating hours required. The decreased rate alternative would require that water be pumped from wells at a lower rate but for a longer period of time. The overall requirement for water over the life of the project would be about 12% greater than for the Proposed Action.

The estimated well pumping rate for this alternative is 675 gallons per minute for a project life of 12.5 years. The maximum projected drawdown at the water supply wells would be 76 feet which is 9% less than the maximum drawdown projected under the Proposed Action. The drawdown analysis is included in the Hydrology Study (Appendix VIII).

This alternative would have a favorable short term environmental impact on groundwater/water supply as compared to the Proposed Action, but its overall long term impact on the environment would be **Less Than Significant**, the same as for the Proposed Action.

Both the Proposed Action and the alternative would use the same design, construction and monitoring technology for the control of a potential release of contaminants to groundwater. There would be no differential effect upon the ground water as a result of

either process rate. This alternative would have no significant environmental impact on water quality as compared to the Proposed Action.

The environmental impact of the decreased mining and processing rate alternative on existing groundwater/water supply would be **Less Than Significant**, the same as for the Proposed Action.

#### 4.3.2.2 Air Quality

Under this scenario, mining and processing rates would decrease by 20% resulting in lower emissions for a longer time period than in the Proposed Action. A review of the $PM_{10}$ emissions sources was made to determine which sources would decrease and which would remain the same as in the Proposed Action. For calculation of the 24-hour $PM_{10}$ concentration, the blasting and wind erosion sources will remain the same as in the Proposed Action. Blasting only occurs once per day but on fewer days than in the Proposed Action. Wind erosion is based on the surface area of exposed overburden piles which would be similar to the Proposed Action. Emissions from all other sources would decrease by approximately 20% from the decreased activity.

For the dispersion model prepared for the Proposed Action, the individual sources were evaluated for their contribution to the maximum impact. A sensitivity analysis was conducted to estimate the impact of the decrease in production rate on the maximum calculated $PM_{10}$ concentration by scaling the appropriate variable sources by 20% and keeping the unaffected sources unchanged. The estimated 24-hour $PM_{10}$ concentration resulting from the decreased processing is a maximum of 41.12 $\mu g/m^3$. This is below the California 24-hour standard of 50 $\mu g/m^3$, and less than the estimated $PM_{10}$ concentration of 45.62 $\mu g/m^3$ for the Proposed Action.

Neither the federal or state air quality standards would be exceeded by the alternative. Therefore, implementation of the decreased rate alternative is similar to the Proposed Action and will have a **Less Than Significant** air quality impact.

#### 4.3.2.3 Noise

The noise generated by this alternative would be related to the mining and processing rate and the effect the rates have on the length of the project. During operations, the primary difference between this alternative and the Proposed Action would be the amount of material blasted, the size and amount of mining equipment needed, and the size and amount of the crushing/screening facility equipment.

For the decreased production rate alternative, the present schedule of one blast per day, an average of five days per week, may be decreased to blasting about four days per week. This would result in no change in the maximum noise generated by blasting on a daily basis.

This alternative would require fewer pieces of mining equipment, although similar in size, than needed in the Proposed Action. It would likely reduce six significant pieces of equipment from the mining fleet, but the mine would still operate 24-hours per day.

The crushing facilities would produce somewhat less noise than the Proposed Action, but not in proportion to the production rates. It is expected that a smaller jaw crusher, one less standard cone crusher, and one less impact crusher would be used relative to the Proposed Action. A 20% decrease in equipment would result in a decrease of approximately 1 to 2 dB in overall noise at sensitive receptors.

The decreased rate alternative would result in the generation of less noise, but for over a longer project life. For this alternative and for the Proposed Action, noise generated would meet County requirements. The environmental impact on noise of this alternative, as compared to the Proposed Action, would be positive.

Given the distance from residences, the ambient area noise, and the requirement that the alternative must conform to the County noise regulations, the impact of this alternative on existing noise would be **Less Than Significant**, the same as for the Proposed Action.

#### 4.3.2.4 Socioeconomics

The effect of this alternative on construction expenditures would be no material change in construction employment and a decrease in equipment expenditures, due to the decreased size and/or amount of equipment required. The construction duration would be about the same as in the Proposed Action.

During the operating life of the project, employment would be about 203 people, a decrease of 7% from the Proposed Action. Total wages and operating expenditures would be decreased on an annual basis, providing a reduced annual effect with respect to the Proposed Action, but occurring for more years.

Total property taxes would not change significantly because the same resource would be mined. Other use taxes would likely decrease, but be paid for a longer time. The effect on property values would be similar to the Proposed Action.

This alternative would create no significant change in the environmental impact associated with socioeconomics as compared to the Proposed Action. The environmental impact of the decreased mining and processing rate alternative on existing socioeconomics would be **Beneficial**, the same as for the Proposed Action.

#### 4.3.2.5 Health Hazards/Public Safety

A sensitivity analysis was conducted on the incremental excess health risk from toxic air contaminants from the Proposed Action to evaluate any changes resulting from the decreased mining and processing rate alternative. The results are included with the air

modeling for the Proposed Action (Appendix X). The decreased mining and processing rate is not designed as a smaller project. It is the same project completed over a longer period of time.

Incremental risk is based on project life as well as the amount of particulate emissions. For all sources except wind erosion, the total emissions from the project will not change in a reduced rate scenario, thus the incremental risk from these sources will be the same as in the Proposed Action. Wind erosion emissions are based on the surface area of the overburden piles exposed for a certain time period. Since the decreased processing rate alternative will have a 25% longer life, wind erosion emissions and their contribution to the total risk will be increased by approximately 25%. Wind erosion emissions represent approximately 9.8% of the risk at the maximum exposed location. Increasing the project life by 25% will increase the overall risk from the project by about 2% to 5.1 $\times 10^{-6}$ from 5.0 $\times 10^{-6}$ for the Proposed Action. These results are essentially the same within the accuracy of the emissions estimates and the air dispersion model.

Due to the decreased scale of the operation, fewer reagents, chemicals, and other supplies would be delivered to and stored at the project site daily. This is a slight decrease in exposure potential relative to the Proposed Action. The project design provides for spill prevention and containment, therefore, the effect of this alternative would be insignificant.

Similar to the Proposed Action, public access to hazards associated with historical mining activity, such as open adits and shafts, mine wastes, and buildings, will be eliminated. These protective measures will result in a **Beneficial** impact, the same as the Proposed Action.

#### 4.3.2.6 Traffic and Transportation

##### 4.3.2.6.1 Existing Traffic and Parking

The primary effect on traffic and parking of the decreased production rate alternative would be on the number of employees working at the site. Fewer employees and a lower rate of production would result in less traffic and the need for less parking than the Proposed Action. The project site has sufficient road capacity and parking area for the Proposed Action. The environmental impact of the decreased mining and processing rate alternative on existing traffic and transportation therefore would be **Less Than Significant**, the same as for the Proposed Action.

### 4.3.3 Status of Alternative

This alternative examines the environmental effects of a decreased rate of mining and ore processing relative to the Proposed Action. The decreased rate alternative is technically feasible. With respect to overall environmental impacts, there would be no significant difference between this alternative and the Proposed Action. With respect to the Proposed Action this alternative would:

- Produce a negative potential impact on water supply, due to the need for an increased total amount of water.
- Produce potential for minor positive effects on air quality, noise and traffic.

Although this alternative is technically feasible, it is not an environmentally superior alternative to the Proposed Action.

## 4.4 Reduced Project Size (Reduced Topographic and Visual Impact)

### 4.4.1 Description of Alternative

This alternative evaluates the changes that would be made to the Proposed Action if it were to be designed to reduce or eliminate the topographic and visual resource impacts of the project. It is based upon the avoidance of mining in areas that would affect the primary ridge lines of Soledad Mountain, thus maintaining the basic silhouette of Soledad Mountain and reducing the impact on the visual character of the mountain. This alternative also illustrates the effect of a general reduction in size of the project that might be proposed for any other purpose.

In this alternative the amount of ore mined would be reduced to 17.4 million tons, a reduction of 70% from the reasonably foreseeable minable ore reserve. Overburden mined in conjunction with this amount of ore would total 44 million tons, a reduction of 80%.

Based upon an operating rate that would produce and process up to 6 million tons of ore per year (the same as for the Proposed Action) the mining life of this alternative would be reduced to about three years.

The change in potential environmental impacts resulting from this alternative would be primarily related to the change in amount of surface disturbance and the reduced mine life.

The percentage reduction in total tonnage mined would not be reflected in a proportional reduction in the surface area disturbed. This is because the volume to surface area relationship of the overburden piles and the heap leach pads tend to become less efficient with decreasing size and because the same basic amount of area is needed for facilities such as the process plant, offices, maintenance shops and other ancillary and support requirements.

For this alternative, however, the west heap leach pad would not be built, the north heap leach pad would be reduced in size by about 50%, and one of the overburden piles might be eliminated.

The annual operating requirements for this alternative would be similar to the Proposed Action with regard to the number of employees, the annual scale of the operation, and consumption of reagents, water, operating supplies and maintenance supplies. Other operating impacts on the environment would also be similar to the Proposed Action, with the total effect on some, such as total water consumed, being reduced due to the shorter project life.

### 4.4.2 Environmental Analysis

The following environmental resources associated with the reduced project size have the same impacts as the Proposed Action as discussed in Section 3.0 and summarized in Table 4.0-1:

| | |
|---|---|
| Paleontological Resources | Section 3.8 |
| Land Use | Section 3.11 |
| Recreation | Section 3.12 |

#### 4.4.2.1 Mineral Resources

This alternative would have a negative environmental impact on mineral resources as compared to the Proposed Action. The minable mineral resource identified for the Proposed Action would not be utilized to its optimum extent.

As a result of the reduction in the scope of the project, mining would not proceed to the extent it would in the Proposed Action. This would result in less geologic understanding of the mineral resources being gained because less opportunity for examination and

correlation of the geologic features of the site would be possible. Also, since the extent of the deposit that can be mined would be limited due to topography, there would be less incentive to continue exploration drilling and geologic work.

Therefore, the impact that this alternative would have on the undiscovered mineral potential at the site, with respect to the Proposed Action, would be negative, since reduced and/or restricted development and exploration would result in a loss in the potential for the discovery of additional important mineralization.

With respect to the existing environment, the environmental impact of this alternative upon mineral resources, both known and unknown, would be **Beneficial**, the same as for the Proposed Action, since it would represent a use of known minerals and present some opportunity for the discovery of currently unknown mineralization.

### 4.4.2.2 Physiography and Geology

#### 4.4.2.2.1 Topography

This alternative would, by definition, have a favorable environmental impact on topography as compared to the Proposed Action. The main ridges that define the silhouette of the mountain would remain. The overburden piles and the north ore heap leach pad would be built in the same locations, but they would be smaller in area, if not in height. The west heap leach pad would not be built and one overburden pile might be eliminated. Reclamation of the existing disturbances would create a **Beneficial** impact.

The net effect would be a reduction in environmental impact both visually and topographically from the Proposed Action. The impact of this alternative on the existing environment would be, by definition, **Less Than Significant**.

#### 4.4.2.2.2 Seismic Hazards

The same design and construction criteria and procedures would be used that would be used for the Proposed Action. In both cases, existing structures, features, and facilities would be stabilized and/or eliminated, reducing the hazard that would exist with a No Action alternative, although somewhat fewer of the old mine workings may be impacted with the reduced size alternative. The environmental impact of the reduced project size alternative on existing seismic hazards would be **Less Than Significant**, the same as for the Proposed Action.

### 4.4.2.3 Soils

Other than a reduction in surface area disturbed, the effect of this alternative on soils would be the same as in the Proposed Action. The same soil types will be disturbed. The Arizo and Cajon soils will be salvaged for use as reclamation growth media. The environmental impact of the reduced project size alternative on existing soils resources would be **Less Than Significant**, the same as for the Proposed Action.

### 4.4.2.4 Hydrology

#### 4.4.2.4.1 Surface Water

Essentially the same grading and drainage patterns would be used as those planned for the Proposed Action. The location of the mine, overburden piles, and other facilities would be similar, although requiring somewhat less surface area. The western heap leach pad, portions of the north heap leach pad, and one of the overburden piles would be eliminated, leaving existing erosion patterns in tact.

Erosion potential and contact of surface waters with overburden piles would be similar, except that the number of years available for contact with unreclaimed materials would be less than for the Proposed Action. Given that the project site materials have been

shown to not have acid generation potential, the environmental impact of the reduced project size alternative on existing surface water resources would be **Less Than Significant**, the same as for the Proposed Action.

#### 4.4.2.4.2 Groundwater/Water Supply

The rate at which groundwater is required for the project and the total amount of water required over the life of the project vary according to the rate at which ore is mined and processed and the number of years the project is active. In this alternative, the annual operating rate for the project would be the same as for the Proposed Action. Therefore, the operating rate of drawdown would be the same as for the Proposed Action, but would last for fewer years.

The estimated well pumping rate for this alternative is 750 gallons per minute with a project life of 3 years. The maximum projected drawdown versus time will be 76 feet after 3 years, the same as under the Proposed Action. The drawdown analysis is included in the Hydrology Study (Appendix VIII). The cumulative water requirements would be 70% less than the Proposed Action. Overall, this alternative would have less effect upon the existing groundwater/water supply than the Proposed Action and the impact to the existing groundwater/water supply would be **Less Than Significant**, the same as for the Proposed Action.

Similarly, the effect of this alternative on groundwater quality would be the same as for the Proposed Action. The environmental effect of the alternative on the existing groundwater quality would be **Less Than Significant**, the same as for the Proposed Action.

### 4.4.2.5 Air Quality

Under this scenario, the total size of the project will be reduced by 70% to 80%, but the daily and annual processing rates would be approximately the same as the Proposed

Action. For calculation of the 24-hour $PM_{10}$ concentration, all emission sources will remain the same as in the Proposed Action. Therefore no change is expected in the maximum estimated 24-hour $PM_{10}$ concentration of 45.62 $\mu g/m^3$. Thus, the short term and long term effect of the No Action alternative is **Less Than Significant**.

#### 4.4.2.6 Biology

##### 4.4.2.6.1 Vegetative Resources

This alternative would result in less surface area being disturbed and less total disturbance to existing vegetative resources, as compared to the Proposed Action. Similarly, because less mining would occur in this alternative, the amount of reclamation and time to accomplish reclamation will be reduced. The same procedures as in the Proposed Action would be implemented to protect vegetation and to affect revegetation in this alternative. The environmental impact of the reduced project size alternative on existing vegetative resources would also be **Less Than Significant**, the same as for the Proposed Action.

##### 4.4.2.6.2 Wildlife Resources

This alternative would result in less total surface area being disturbed and less overall disturbance to wildlife resources as compared to the Proposed Action, although the amount of disturbance will be the same for the first three years in either case because the mining rate is the same. Because less mining would occur in this alternative, the amount of reclamation and time to accomplish reclamation will be reduced relative to the Proposed Action. The same procedures as in the Proposed Action would be implemented to protect wildlife. The environmental impact of the reduced project size alternative on existing wildlife resources would be **Less Than Significant**, the same as for the Proposed Action.

#### 4.4.2.7 Cultural and Historical Resources

This alternative would result in the disturbance of less land surface than in the Proposed Action and would reduce or avoid the disturbance of at least three of the four sites which have been judged to be significant with respect to the history and development of this area. The same data recovery and preservation measures would be implemented, where needed, in this alternative as are planned for the Proposed Action.

This alternative would have less impact on cultural and historical resources than the Proposed Action and provide for less data recovery. The environmental impact of the reduced project size alternative on existing cultural and historical resources would be **Less Than Significant** after the Phase III Data Recovery is completed on the sites identified as having scientific and historical value.

#### 4.4.2.8 Visual Resources

This alternative has been designed to reduce the visual resources impact of the project by avoiding mining of the ridge lines which frame the silhouette of the mountain. It would therefore have less visual impact on the project site as compared to the Proposed Action.

Since analysis of the visual impact of the Proposed Action on the environment has resulted in the determination that the Proposed Action will have a Less Than Significant effect, this alternative would also have a **Less Than Significant** effect.

#### 4.4.2.9 Noise

Noise generated from the project would be a function of the location of operations within the site and the scale of the mining and processing operations. Since this alternative would have operations being conducted at the same locations and at the same scale as in the Proposed Action, the noise resulting from operations would be equivalent to that

of the Proposed Action. The primary difference is that the length of time that noise would be generated in this alternative would be reduced.

This alternative would have a similar noise impact as the Proposed Action. The impact of the reduced project size alternative on existing noise would be **Less Than Significant**, the same as for the Proposed Action.

#### 4.4.2.10 Socioeconomics

Since the annual scope of this alternative is the same as for the Proposed Action, the socioeconomic effect of the project during construction and its operating life would be essentially the same as that for the Proposed Action. After that, employment would be eliminated and additional construction associated with continued operations would be foregone. This would effectively eliminate about seven years of employment for an estimated 230 people from the local economy, relative to the Proposed Action.

Property taxes would be reduced, since the overall value of the project would be reduced with respect to the Proposed Action. Other use taxes would be unchanged from the Proposed Action, but would be paid for a shorter period of time.

The net result of this alternative would be a reduction in the economic value and economic stability of the project to the local economy. It would also result in a major decrease in the value of the project to Golden Queen, which would likely put the project into jeopardy. This alternative would have an overall non-beneficial effect as compared to the Proposed Action. If, however, the project were to proceed under this alternative, the effect on existing local socioeconomics would continue to be **Beneficial,** although less so than the Proposed Action.

#### 4.4.2.11 Health Hazards/Public Safety

A sensitivity analysis was conducted on the incremental excess risk from the proposed action to evaluate any changes resulting from the reduced project size alternative. The results are included with the air modeling for the Proposed Action (Appendix X). The incremental risk is based on the project life as well as the amount of emissions. A 70% reduction in project size and a 70% reduction in project life will result in a 70% reduction in maximum excess cancer risk compared to the Proposed Action. Therefore, the maximum expected excess cancer risk from this alternative is $1.5 \times 10^{-6}$ compared to the risk of $5.0 \times 10^{-6}$ from the Proposed Action, both less than the significance threshold of $10.0 \times 10^{-6}$.

The processing rate is the same as the proposed action, therefore the volume of reagents, chemicals, and other supplies delivered to and stored at the project site would be the same as the Proposed Action.

Similar to the Proposed Action, public access to hazards associated with historical mining activities such as open adits and shafts will be eliminated. Some of the existing mine waste would remain in place due to the reduction in heap leach pads and overburden piles. The protective measures are Beneficial but less so than the Proposed Action. Thus, the environmental impact to health hazards and public safety of this alternative is **Less Than Significant**.

#### 4.4.2.12 Traffic and Transportation

##### 4.4.2.12.1 Existing Traffic and Parking

The only difference between this alternative and the Proposed Action would be the length of time the project would be in operation. This alternative would have no effect on the amount of parking required, relative to the Proposed Action, since there would be no difference in construction or operations employment. It would not have any effect on

traffic either, except that traffic as a result of the project would last fewer years. Since the impact on traffic and parking of the Proposed Action would be less than significant, the effect of this alternative on existing traffic and parking would also be **Less Than Significant**.

#### 4.4.2.12.2 Local Transit

This alternative would have no effect on the amount of local transit required, relative to the Proposed Action, since there would be no difference in construction or operations employment. Since the impact on local transit of the Proposed Action would be less than significant, the effect of this alternative on local transit also would be **Less Than Significant**.

#### 4.4.2.12.3 Pedestrians

This alternative would have no effect on pedestrians, relative to the Proposed Action, since there would be no significant difference in the scale of the project or difference in construction or operations employment. Since the impact on pedestrians of the Proposed Action would be less than significant, the effect of this alternative on pedestrians would also be **Less Than Significant**.

### 4.4.3 Status of Alternative

The reduced project size alternative examines the environmental effect of the project designed to minimize topographical impact and improve, incrementally, visual impacts. This alternative would be technically feasible.

This alternative is superior to the Proposed Action only in its effect on the topography of the site. In other respects, its environmental impacts are essentially equivalent to the Proposed Action. With respect to the visual impact of this alternative relative to the Proposed Action, there is little difference, and this may be of more relevance than the

topographic impact. Socioeconomically, this alternative would result in a less stable economic base.

The minor improvement in visual impact and topographic effect, coupled with the negative socioeconomic impact and less beneficial health hazards/public safety impact, fails to make this a superior alternative to the Proposed Action. The reduction in the scope of the project that results from this alternative would likely render the project unfeasible from a development standpoint, putting the project, and the realization of the benefits the project would produce, in jeopardy. Therefore, this alternative should be eliminated from consideration.

# 5.0 CEQA STATUTORY SECTIONS

The environmental impact analysis of the Proposed Action considered the impact to environmental resources as required by CEQA and NEPA. This chapter presents a summary of environmental impacts and discusses short term versus long term productivity and growth inducing impacts of the Proposed Action in ways not otherwise addressed in specific detail in the Administrative Draft EIR/EIS.

## 5.1 Summary of Environmental Impacts of the Proposed Project

### 5.1.1 Impacts Found to Be Less Than Significant

Resources for which the impacts are designated as less than significant, defined as those impacts that result in no substantial adverse change to existing environmental conditions, include: soils, hydrology, air quality, biologic resources, paleontological resources, visual resources, noise, land use, recreation, and traffic and transportation. Most, if not all, of these resources will be impacted to some extent by the Proposed Action. When taken in the context of the existing environment and existing federal, state, and local regulatory requirements, the impacts to these resources, either by design, reclamation, or mitigation, result in no significant impact or degradation to the resources as a result of the Proposed Action.

### 5.1.2 Impacts Mitigated to a Level of Less Than Significant

Significant impacts are defined as impacts which constitute substantial adverse change to existing environmental conditions that can be mitigated to less than significant levels by implementing specified mitigation measures. Included within the Proposed Action are numerous activities, such as reclamation plans, grading plans, cultural resource evaluations, and soil erosion control measures, that may constitute mitigation measures.

As a result of the Proposed Action, sites of historical significance will be impacted. This is, by definition, a Significant (and potentially unavoidable) impact. However, project related cultural resource evaluation and data recovery efforts will reduce the impact to Less Than Significant. Given the rate of deterioration of the resource, these data recovery efforts will result in a Beneficial impact of the project, since without the project it is likely that these resources will be lost.

There are no additional resources identified as being impacted in a significant manner for which mitigation measures beyond those activities planned as part of the proposed Action should be imposed.

### 5.1.3 Significant and Unavoidable Impacts

Significant and Unavoidable impacts are those which constitute a substantial adverse change to existing environmental conditions that cannot be fully mitigated by implementing all feasible mitigation measures. The impact to topography has been identified as the only resource that will be impacted in this manner.

As a result of the Proposed Action, ore and overburden materials will be mined from Soledad Mountain, resulting in the alteration of topography by the mine and by the creation of the heap leach piles and the overburden piles. Reclamation of the ore and overburden piles will mitigate the long term effect of the Proposed Action upon most of the resources, but the piles and the mine will remain as permanent topographic features that did not exist prior to the project.

### 5.1.4 Beneficial Impacts

Beneficial impacts are defined as impacts which result in a positive change to existing environmental conditions. Since the Proposed Action is based upon the recovery of precious metals, the mining of the known mineral resources, as well as the potential sale

of overburden for aggregate and construction materials, will be an overall beneficial impact to the mineral resources of Soledad Mountain.

The environmental impacts of the Proposed Action to mineral resources, seismic hazards, long term air quality, cultural and historical resources, socioeconomics, and health hazards/public safety were found to be Beneficial.

## 5.2 Short Term Uses Versus Long Term Productivity

Federal mining laws encourage mineral development provided appropriate attention is given to a long term balance between resource production, energy use, a healthy environment, natural resource conservation, and social needs. SMARA encourages the production of minerals while giving consideration to environmental resource. The Specific Plan for Soledad Mountain - Elephant Butte and Vicinity - South of Mojave recognizes gold and silver mining operations as important land uses. The protection of commercial value ores and deposits is incorporated into the plan through restriction of incompatible land uses.

The County land use goals for the area in which the Soledad Mountain project is proposed include mining, low density residential, and open space. Current use of the land is consistent with these goals. The Proposed Action will return the property to this use following mining. Recreational use of the project area is minimal, due to the nature of the property and the scattered ownership, both public and private, of the project area lands. The Proposed Action, which includes project development, mining and processing operations, and reclamation, will be consistent with these land use goals over the short and long term.

Over the short term, the project area will be dedicated for mining use, and will impact existing wildlife and the visual character (open space) of the site. Following mining, reclamation will provide renewed wildlife habitat and open space, although somewhat modified from that which currently exists. Revegetation, which may take several

decades to fully establish itself in density and diversity, will be restored to the approximate natural conditions that now exist. The open pit mine would be reclaimed to a level where it would constitute no risk to health and safety and would provide habitat for wildlife not dissimilar to the steep and rocky topography that now exists in some areas of the site. The mine would remain available to future mineral development. Long term productivity of the site, with regard to land use goals, will be essentially unaffected by the Proposed Action.

The short term commitment of resources to mineral development, as well as the unavoidable impacts, are justified by the beneficial socioeconomic and health hazard/public safety impacts that the project will produce, in addition to the other beneficial impacts discussed in Section 5.1.4.

### 5.3 Growth Inducing Impacts

It is expected that the Proposed Action will not produce significant growth inducing impacts to the local area. Within a fifty mile commuting distance of the project adequate housing, utilities, schools, and commercial and government services already exist with the capacity to absorb the level of employment and secondary jobs that the project would support. Most (80%) of the jobs created at the project are expected to be filled by persons who already live in the area. The recent closure of two mining operations and the current level of economic growth and unemployment in the area will allow this project to begin operations without placing significant new demand for utilities, government services, or other support services.

# 6.0 COMMENTS AND RESPONSE TO COMMENTS

The Comments and Response to Comments section is reserved for preparation after the initial circulation of the document with the appropriate Notice of Preparation and Notice of Intent notifications.

# 7.0 MITIGATION MONITORING PROGRAM

As part of the CEQA process administered by Kern County, a Mitigation Monitoring Program will be prepared and incorporated in this section. The Mitigation Monitoring Program will incorporate the design criteria and mitigation measures which are developed to avoid potentially Significant impacts related to the development of the project, and specific conditions of approval associated with the CUP.

The Mitigation Monitoring Program provides a method of tracking compliance with these design criteria and mitigation measures by recording and documenting the acquisition of various construction and operating permits and the results of various field inspections. Updated copies of the Mitigation Monitoring Program will be maintained by Golden Queen and the Kern County Planning Department, providing a mechanism for the public and all involved agencies to verify compliance with the approved CUP and Plan of Operations.

# 8.0 REPORT PREPARATION

## 8.1 List of Preparers

This Environmental Review was prepared by Kern County Planning in conjunction with BLM with the assistance of WZI Inc., a third party contractor. Other individuals and companies also made significant contributions. The following is a list of individuals responsible for preparation of the Administrative Draft EIS/EIR.

Kern County Planning and Development Services personnel include:

**Ted James**, Director
**Glenn Barnhill**, Special Projects Division Chief
**Scott Denney**, Associate Planner

Bureau of Land Management personnel include:

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WZI Inc. personnel include:

**Mary Jane Wilson**, President, Chief Executive Officer, B.S., Petroleum Engineering, Stanford University, California Registered Environmental Assessor No. 00050. Environmental Professional with over 20 years experience in projects including Environmental Impact Statements, Environmental Impact Reports, Environmental Assessments, Waste Discharge Requirements, and air quality permits. Areas of expertise include regulatory compliance and strategic planning.

**Steve Muir**, Manager - Geotechnical Services, M.S., Geology, California State University, Northridge, B.S, Geology, University of California, Los Angeles. State of California Registered Geologist No. 3769, State of California Certified Engineering Geologist No. 1224, State of California Registered Geophysicists 945, State of California Registered Environmental Assessor No. 01917. Twenty years experience in conducting and supervising surface and subsurface engineering of geological and geophysical mapping projects for natural resource exploration, geotechnical and environmental engineering investigations.

**David Weiss**, (currently with U.S. BORAX Inc.), Manager - Mining Services, B.S. Mining Engineering, University of Missouri, State of Colorado Registered Professional Engineer NO. 14253. Twenty-four years experience in the mining industry in designing and operating mining projects. Regulatory compliance experience includes Prevention of Significant Deterioration Permits, Conditional Use Permits, Surface Mine Permits, Surface Mine Reclamation Plans, Permits to Operate, Health Risk Assessments, Reports of Waste Discharge, Plans of Operation and Environmental Impact Analyses.

**Laura Bazeley**, Manager - Geology, M.S. Geology, University of Delaware, B.S., Geology, State University of New York at Binghamton. State of California Registered Geologist No. 4340. Over 17 years geologic experience in geologic investigations for natural resource exploration, contamination investigations, groundwater investigation, and land use planning issues. Regulatory compliance expertise in waste water disposal, hydrogeologic assessments, site characterizations, Conditional Use Permits, Environmental Impact Reports, Environmental Impact Statements and Reports of Waste Discharge.

**Allen Waggoner**, Senior Geologist, M.S., B.S. Geology, San Diego State University, State of California Registered Geologist No. 5719, State of California Certified Engineering Geologist 1818. Over fifteen years experience as a geologist in geotechnical, environmental and natural resource industry. Experience in field investigations and geologic mapping for mineral exploration.

**Greg McNeish**, Senior Engineer, B.S. Chemical Engineering, University of Kansas, State of California Registered Engineer P.E. Over 6 years experience in air quality permitting and air dispersion modeling together with 16 years experience in natural resource production and waste water disposal. Experience includes PSD permit applications, preparation of health risk assessments and compliance with the California Environmental Quality Act.

**Robert Langner**, Projects Manager, M.B.A. California State University, Bakersfield, B.S. Management Information Science, California State University, Sacramento. California Registered Environmental Assessor No. 5576. Eight years experience in air quality permitting, air toxics, compliance with the California Environmental Quality Act, and land use planning.

**Steven S. Stillar**, Technical Advisor, B.S. Chemical Engineering, Montana State University. Twenty seven years in mining and mineral processing management, operations, and engineering. Experience includes preparation of Environmental Impact Statements, Environmental Impact Reports, Environmental Assessments, Air Quality Permits, Mine Reclamation Plans, Plans of Operation, and Conditional Use Permits.

**Elizabeth Kendall**, Staff Geologist, M.S. Geology, Oregon State University, B.S. Geology, Tufts University. Eight years experience in environmental and natural resource industry. Experience includes investigations for environmental assessments and geologic mapping for mineral development.

Companies and individuals providing specialized background investigations include:

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**Ingrid Hanne, M.S.**, Ecologist

**Brown-Berry Biological Consulting**

**Patricia E. Brown**, **Ph.D.**, Wildlife Biologist

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## 8.2 Persons/Agencies Consulted

The following persons/agencies were consulted during the preparation of this Environmental Review.

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California Department of Fish and Game, Larry Single
California Department of Transportation District 9, Katy Walton
Kern County Air Pollution Control District, Mary Flynn, Will Lund
Lahontan Regional Water Quality Control Board, Ted Evans

Federal Agencies

United States Fish and Wildlife Service, Kirk Waln

Local Agencies

Kern County Environmental Health Services Department, Lloyd Weese
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Bureau of Land Management Ridgecrest Resource Area
300 South Richmond Boulevard
Ridgecrest, CA 93555

U.S. Department of Agriculture
Natural Resources Conservation Service
1601 New Stine Road, Suite 270
Bakersfield, CA 93309-3698

County Administrative Office/Fiscal
1115 Truxtun Avenue, 5th Floor
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Department/Floodplain Management Section
2700 "M" Street, Suite #500
Bakersfield, CA 93301

Kern County Engineering and Survey Services
Survey Department
2700 "M" Street, Suite #300
Bakersfield, CA 93301

Kern County Fire Department
5642 Victor Street
Bakersfield, CA 93308

Kern County Health Department
1700 Flower Street
Bakersfield, CA 93305

Kern County Library/
Administration/Beale Library
1415 Truxtun Avenue
Bakersfield, CA 93301

Kern County Air Pollution Control District
2700 "M" Street, Suite #290
Bakersfield, CA 93301

Kern County Museum
3801 Chester Avenue
Bakersfield, CA 93301

Kern County Planning Department/
Special Projects
2700 "M" Street, Suite #100
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Kern County Parks Department
1110 Golden State Avenue
Bakersfield, CA 93301

Resource Management Agency/Fiscal
2700 "M" Street, Suite #350
Bakersfield, CA 93301

Kern County Library/Rosamond Library
2646 Diamond
Rosamond, CA 93560

Kern County Sheriff's Department/
Fiscal Analysis
1350 Norris Road
Bakersfield, CA 93308

Kern County Roads Department
2700 "M" Street, Suite #400
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Kern County Roads Department/Transit
2700 "M" Street, Suite #400
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Kern County Waste Management Department/
Special Districts
2700 "M" Street, Suite #500
Bakersfield, CA 93301

Kern County Waste Management Department/
Solid Waste
2700 "M" Street, Suite #500
Bakersfield, CA 93301

Kern County Waste Management Department/
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LAFCO
2700 "M" Street, Suite #302
Bakersfield, CA 93301

Mojave Public Utility Dist.
15844 "K" Street
Mojave, CA 93501

Mojave Unified School Dist.
3500 Douglas
Mojave, CA 93501

Eastern Kern Resource
Conservation District
P.O. Box 626
Inyokern, CA 93527

Native American Heritage Council
of Kern County/Robert Gomez
2619 Driller Avenue
Bakersfield, CA 93306

Pacific Bell Engineering
Attention: Beverly Hendrix
5101 Office Park Drive, Room 300
Bakersfield, CA 93309

Sierra Club/Kern Keaweah Chapter
Arthur Unger
2815 La Cresta Drive
Bakersfield, CA 93305

Southern California Edison
Planning Department
510 S. China Lake Boulevard
Ridgecrest, CA 93555

Southern California Gas Company
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Bakersfield, CA 93308

Southern Pacific Transportation Co.
Real Estate Dept., Room 225
One Market Plaza
San Francisco, CA 94105

Southern San Joaquin Valley
Archaeological Infor. Center California
State University
9001 Stockdale Highway
Bakersfield, CA 93309

State Air Resources Board
Stationary Resource Division Attn:
Barbara Fry
P.O. Box 2815
Sacramento, CA 95812

CalTrans District 6
P.O. Box 12616
Fresno, CA 93778

State Office of Planning & Research
1400 Tenth Street, Room 121
Sacramento, CA 95814

California State University
Bakersfield - Library
9001 Stockdale Highway
Bakersfield, CA 93309

California Energy Commission
11516 Ninth Street, Room 200
Sacramento, CA 95814

State Fish and Game
1234 East Shaw Avenue
Fresno, CA 93710

State Fish and Game
1416 Ninth Street
Sacramento, CA 95814

State Dept. of Health Services
5545 East Shields Avenue
Fresno, CA 93727

California Highway Patrol
Planning & Analysis Division
P.O. Box 942898
Sacramento, CA 94298-0001

Integrated Waste Management
Attn: Vince Paul
8800 Cal Centre Drive
Sacramento, CA 95826

Native American Heritage Commission
915 Capitol Mall, Room 288
Sacramento, CA 95814

Public Utilities Commission
Attn: Bob Penny
350 McAllister Street, Room 3230
San Francisco, Ca 94102

Department of Conservation
Office of Mine Reclamation Attn: James Pompy
801 "K" Street MS 09-06
Sacramento, CA 95814-3529

California Regional Water Quality Control Board/Lahontan Region
2092 Lake Tahoe Boulevard, Suite 2
South Lake Tahoe, CA 96150

State Lands Commission
100 Howe Avenue, Suite 100-South
Sacramento, CA 95825-8202

State Dept. of Water Resources
San Joaquin Dist.
3374 East Shields Avenue, Room A-7
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# 9.0 GLOSSARY AND REFERENCES

## 9.1 Glossary of Technical Terms

The definitions below are provided as clarification for terms used in this document.

| TERM | DEFINITION |
|---|---|
| Active fault | Fault with recent seismic activity as to have displaced Holocene materials (up to 10,000 years old). |
| Activated carbon | A mostly pure carbon product that has been treated in a kiln to remove impurities and maximize its adsorption capacity. |
| Adsorb | A chemical process where a molecule attaches loosely to the surface of another phase, without becoming incorporated into that phase. |
| Adit | A more or less horizontal surface opening to an underground mine. |
| Agglomeration | The process by which fine particles of crushed rock are bound to larger pieces of crushed rock so that fine particles within the heap leach pad do not inhibit percolation of leach solutions. |
| Average Daily Trips | The average number per day of vehicles passing a traffic count location. |

| TERM | DEFINITION |
|---|---|
| Alluvium | A general term for geologic materials deposited by running water (e.g., streams, rivers). The term applies to deposits of recent time that have not been consolidated and cemented into rock. |
| Alquist - Priolo Special Studies Zone | Areas established around active faults as stated in the Alquist-Priolo Special Studies Zones Act, Chapter 75, Division 2 of the California Public Resources Code. |
| Ancillary facilities | Support structures and equipment. |
| Authority to Construct | Written permit which must be obtained from the KCAPCD prior to construction, alteration, or replacement of any article, machine, or equipment which may emit air contaminants or affect in any way the emission of those contaminants. |
| Barren solution | Non gold-bearing dilute cyanide solution. |
| Baseline data | Data gathered to describe the conditions that exist before an action is taken. |
| Bedding | Layered structure of geologic deposits. |
| Beneficiation | The preparation and treatment of ore for recovery of mineral commodities. Beneficiation includes, but is not limited, to crushing, sizing, drying and leaching. |

| TERM | DEFINITION |
|---|---|
| Berm | An elongate earthen structure, which acts as a barrier, for example, to make it difficult for vehicle to cross, or to redirect the flow of water. |
| California Desert Conservation Area | A program established by Congress with the Federal Land Policy and Management Act of 1976 which provides for the managed use of desert public lands and resources to Plan safeguard the environmental, cultural, and aesthetic values. |
| California Environmental Quality Act | Legislation enacted in 1970 to protect the quality of the environment for the people of California through requiring public agencies and decision makers to document and consider the environmental consequences of their actions. |
| Carbon column | A container in which the carbon adsorption process takes place. Typically the column will be a cylindrical vessel 5 to 6 feet in diameter and up to 15 feet high, filled with activated carbon. The gold-bearing solution is introduced into the vessel, gold from solution adsorbs onto the activated carbon, and the barren solution exits the vessel. |
| Constituents of Concern | Any waste constituents, reaction products, and hazardous constituents that are reasonably expected to be in or derived from waste contained in a waste management unit. |
| Contrast | The effect of a striking difference in form, line, color, or texture of a landscape's features. |

| TERM | DEFINITION |
|---|---|
| Cumulative impacts | Two or more individual effects which, when considered together, compound or increase the impact. |
| Cyanide | A chemical compound comprised of carbon and nitrogen. Cyanide is water-soluble and is used in ore processing solutions to extract gold from crushed rock. |
| Doré | A French term used to describe metal bars comprised mostly of gold and silver with some impurities. |
| Drawdown | The lowering of the water table or potentiometric surface caused by extraction of ground water. |
| Drip irrigation | A process of distributing cyanide solution across the top of the leach pile in order that gold may be leached from the ore. The process uses plastic tubing approximately 1/2-inch in diameter. A small opening about every 18 to 36 inches along the length of the tubing allows a small quantity of processing solution to drip out of the tube. |
| End-dumping | The process of dumping material from the back of a dump truck. Overburden piles are constructed by backing a dump truck on the top surface of a pile to the edge of the pile, and end-dumping the waste rock over the side of the pile. |

| TERM | DEFINITION |
|---|---|
| Effects | Effect and impact are synonymous as used in this report. Direct or primary impacts are those caused by the project and occur at the same time and place. Indirect, or secondary, effects are those which result from the project which occur later in time or father removed in distance or time, but are still reasonably foreseeable. |
| Endangered Species Act | Federal legislation enacted in 1973, as amended, that extends legal protection to plants and animals listed as "threatened" or "endangered" and includes consultation with the FWS. |
| Endangered species | An animal or plant species which is in danger of extinction throughout all or a significant portion of its range, as defined in the Endangered Species Act Amendments of 1982 and by the California Endangered Species Act of 1984. |
| Environment | The physical conditions which exist within the area which will be affected by a proposed project or alternative, including but not limited to land, air, water, minerals, flora, fauna, ambient noise, and objects of historical or aesthetic significance. The environment includes both natural and man-made conditions. |

| TERM | DEFINITION |
|---|---|
| Environmental Assessment | An analytical document prepared under the National Environmental Policy Act that outlines the potential environmental effects of the Proposed Action and its possible alternatives and leads to a decision to prepare an Environmental Impact Statement or a Finding of No Significant Impact. |
| Environmental Impact | A detailed report prepared under the CEQA Report describing and analyzing the significant environmental effects of a project and discussing ways to mitigate or avoid the effects. An EIR is prepared for use by the public, public agencies and agency decision makers to weigh the environmental consequences of a proposed action. |
| Environmental Impact | An analytical document prepared under NEPA Statement that portrays potential impacts to the human environment of a particular course of action and its possible alternatives. An EIS is prepared for use by the public, public agencies, and agency decision makers to weigh the environmental consequences of a proposed action. |
| Fault | A surface or zone along which there has been displacement of the geologic materials on either side relative to one another as a result of seismic activity. |
| Feasible | Capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors. |

| TERM | DEFINITION |
|---|---|
| Fee Land | Land in which the United States government has conveyed the fee simple interest in the surface, and possibly the minerals, into private ownership. |
| Geonet | A coarse plastic net used as a fluid drainage layer in engineering systems. |
| Groundwater | Water found beneath the land surface, in the zone of saturation below the water table. |
| Growth media | Geological and organic materials, including soils, that are suitable for use in growing plants. |
| Habitat | The place where an animal or plant normally lives, often characterized by a dominant plant and co-dominant form, such as creosote bush habitat. |
| Haul road | A road used by large (50- to 100-ton capacity) trucks to haul ore and waste rock from the open pit to other locations. |
| Hazardous material | A substance which, because of its potential for either corrosivity, toxicity, ignitability or chemical reactivity may cause injury to persons or damage to property. |
| Hazardous Materials Business Plan | An inventory of hazardous materials handled on a project or business site including name, quantity, physical state, physical health hazards, and where stored. |

| TERM | DEFINITION |
|---|---|
| Head (static) | The height of fluid above a reference point (e.g., a plastic liner). The head is the driving force that exerts pressure and causes fluid to migrate. |
| Heap | A pile of crushed ore underlain by a liner system engineered to collect the leach solutions. Care is taken during the placement of the crushed ore so as to avoid compaction, in order that the leach solutions can flow freely through the ore to extract the gold. |
| High density polyethylene | A crystalline thermoplastic organic polymer which is used to form a "geomembrane", a flexible membrane liner resistant to ultraviolet radiation. The liner is used for solution containment. |
| Holocene | The epoch of the Quaternary period of geologic time from 10,000 years ago to the present. |
| Hydraulic conductivity | Ratio of flow velocity to driving force for viscous flow under saturated conditions of a specified liquid in a porous medium. |
| Kern County Resource Management Agency Planning Department | Local Lead Agency responsible for implementing California Surface Mining and Reclamation Act and California Environmental Quality Act and approving Conditional Use Permit with accompanying Reclamation Plan subject to conditions. |

| TERM | DEFINITION |
|---|---|
| Lahontan Regional Water Quality Control Board | The California Regional Agency responsible for protection of the waters of the state in the Lahontan Region. This agency is responsible for implementing California regulations, through the issuance of Waste Discharge Requirements, Waste Discharge Orders and National Pollution Discharge Elimination System permits, which regulate discharges to the waters of the state. |
| Leachate collection and | A term to describe the assembly of recovery system installed for the purpose of capturing fluids to minimize or eliminate the hydraulic head over a liner system. |
| Leaching | A process by which gold is extracted from ore using a dilute cyanide solution. |
| Lead agency | The public agency which has the principal responsibility for carrying out or approving a project (Title 14 CCR, 15367).<br><br>The agency or agencies preparing or having taken primary responsibility for preparing the environmental impact statement (40 CFR, 1508.16). |
| Lycimeter | A device placed just below the liner of the heap leach pad for sampling any fluid which may be found in the vadose zone. |
| Miocene | The epoch of the Tertiary period of geologic time encompassing the period between 5 and 23 million years before present. |

| TERM | DEFINITION |
|---|---|
| Mitigation | A method or procedures which may: (1) avoid an impact altogether by not taking a certain action or parts of an action; (2) minimize impacts by limiting the degree or magnitude of the action and its implementation: (3) rectify the impact by repairing, rehabilitating, or restoring the affected environment; (4) reduce or eliminate the impact over time by preservation and maintenance operations during the life of the action; and (5) compensate for the impact by replacing or providing substitute resources or environments. |
| Monitoring well | A well drilled and completed in a specific area relative to a potential groundwater contamination source to allow periodic checks on the groundwater quality. |

| TERM | DEFINITION |
|---|---|
| Multiple use | The management of the public lands and their various resource values so that they are utilized in the combination that will meet the present and future needs of the American people; making the most judicious use of the land for some or all of the resources or related services over areas large enough to provide sufficient latitude for periodic adjustments in use to conform to changing needs and conditions; the use of some land for less than all of the resources; a combination of balanced and diverse resource uses that takes into account the long-term needs of future generations for renewable and nonrenewable resources including, but not limited to, recreation, range, timber, minerals, watershed, wildlife and fish and natural scenic, scientific and historical values; and coordinated management of the various resources without permanent impairment of the productivity of the land and the quality of the environment, with consideration being given to the relative values of the resources and not necessarily to the combination of uses that will give the greatest economic return or the greatest unit output. |
| National Environmental Policy Act | Legislation enacted in 1969 that require agencies to to include in the decision-making processes: (1) appropriate consideration of all environmental effects; and (2) procedures to avoid or minimize adverse effects; and restore and enhance environmental quality as much as possible. |

| TERM | DEFINITION |
|---|---|
| Notice of Preparation | A brief notice sent by the public agency with principle responsibility for carrying out or approving a project to notify other agencies that an EIR is being prepared under CEQA. |
| Notice of Intent | A notice that an environmental impact statement will be prepared and considered. This is the NEPA-equivalent to a Notice of Preparation. |
| Open pit mine | The area from which ore and overburden materials are removed. |
| Ore | Rock that can be mined for extraction of a mineral commodity under conditions that allow a profit to be made. |
| Overburden | Rock which contains either no gold or gold in quantities that cannot be economically extracted. Because such rock either lies on top of ore or is mixed in which the ore, overburden must be mined in advance of or at the same time as the ore is mined. |
| Ozone | An end product of complex reactions between reactive organic gases (or non-methane hydrocarbons) and Oxides of Nitrogen in the presence of ultraviolet radiation. |
| Prevention of significant deterioration | A term used to describe an air quality permitting process that is triggered by any project that emits certain pollutants above levels prescribed by law. |

| TERM | DEFINITION |
|---|---|
| Patented claims | Mining claims for which the United States government has conveyed the fee simple interest in the surface and minerals into private ownership. |
| Permeability | A measure of the relative ease with which a porous medium can transmit a liquid under a potential gradient. |
| Pregnant solution | A gold-bearing, water-based dilute sodium or calcium cyanide fluid which contains sufficient quantities of gold that it can be sent to the processing plant to recover the gold. |
| Process facilities | As used in this document, generally means the stationary equipment and facilities used to prepare the ore for leaching and extract gold. |
| Project | The whole of an action, which has a potential for resulting in a physical change in the environment. |
| Public land | Any land and interest in land owned by the United States within the several states and administered by the Secretary of the Interior through the BLM, without regard to how the United States acquired ownership, except: (1) lands located on the Outer Continental Shelf; and (2) lands held for the benefit of Indians, Aleuts, and Eskimos. |
| Quaternary | The period of the Cenazoic Era of geologic time between 1.8 million years ago and the present. The Quaternary period includes the Pleistocene and Holocene epochs. |

| TERM | DEFINITION |
|---|---|
| Rare species | A species which, although not presently threatened with extinction, is in such small numbers throughout its range that it may become endangered if its present environment worsens. |
| Recharge | Process by which water infiltrates and is added to an aquifer, either directly or indirectly by way of another rock formation. This term can also be used in reference to the water itself. |
| Receiving Water | The waterbody to which a surface waterbody is a tributary or a contributor. |
| Report of Waste Discharge | A report submitted to the Regional Board containing information on waste characteristics and geologic and climatologic characteristics of the unit and surrounding region and other information as requested in Title 23 CCR, Chapter 15, Article 9 § 2590 leading to an issuance of Waste Discharge Requirements |
| Reserve | The tonnage or volume of material which can be mined under the economic and technological conditions prevailing at the time of appraisal. |
| Resource | The entire mineralized tonnage or volume of material which has been identified and quantified through the use of a sampling campaign. |

| TERM | DEFINITION |
|---|---|
| Responsible agency | The organization that has the legal duty to ensure that a project complies with the appropriate rules and regulations. |
| Seismicity | Oscillation of the ground resulting from shifting of the earth's crust. |
| Sensitive species | Generic term for any plant or animal species which is recognized by the government or conservation group as being depleted, rare, threatened, or endangered. |
| Significant effect | A substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project including land, air, water, minerals, flora, fauna, ambient noise, and objects of historical or aesthetic significance (Title 14 CCR, 15382). Requires consideration of both context and intensity. Under the federal definition, there may be a significant beneficial impact (40 CFR, 1508.27). |
| Site Grading Plan | A report including grading for roads, drainage, erosion control, engineered fills, and the heap leach pad; showing elevations, dimensions, location, extent and slopes in application of a grading permit from Kern County. |
| Specific Plan | Specific Plan for Soledad Mountain - Elephant Butte and Vicinity - South of Mojave: adopted by the Kern County Board of Supervisors as Resolution 73-485. |

| TERM | DEFINITION |
|---|---|
| Tertiary | The period of the Cenazoic Era of geologic time between 1.8 and 65 million years before present. |
| Threatened species | Species which, although not presently threatened with extinction, is likely to become endangered in the foreseeable future in the absence of special protection and management efforts. |
| Vadose zone | The unsaturated zone which occurs above the water table where the soil pores are only partially filled with water (the moisture content is less than the porosity). The fluid pressure is less than atmospheric. This zone is limited above by the land surface and below by the surface of the zone of saturation, that is, the water table. |
| Visual Resource Management | The systematic means to identify visual values, establish objectives which provide the standards for managing those values, and evaluate the visual impacts of proposed projects to ensure that the BLM objectives are met. |
| Waste Discharge Requirements | A permit issued by the California Regional Water Quality Control Board which governs the construction, operation and closure of the heap leach pad and the precious metals recovery plant. |

## 9.2 Acronyms

The definitions below are provided as clarification for abbreviations and acronyms used in this document.

| ABBREVIATION | DEFINITION |
|---|---|
| AB2588 | Air Toxics "Hot Spots" Information and Assessment Act, California |
| ADT | Average daily trips |
| AP | Acid generating potential |
| ATF | Bureau of Alchol, Tobacco, and Firearms |
| BACT | Best Available Control Technology |
| BLM | U.S. Bureau of Land Management |
| CAAQS | California Ambient Air Quality Standards |
| Cal OSHA | California Occupational Health and Safety Administration |
| CAPCOA | California Air Pollution Control Officers Association |
| CARB | California Air Resources Board |
| CCR | California Code of Regulations |
| CDA | California Desert District |

| ABBREVIATION | DEFINITION |
|---|---|
| CDFG | California Department of Fish and Game |
| CEQ | Council of Environmental Quality |
| CEQA | California Environmental Quality Act |
| CESA | California Endangered Species Act |
| CFR | Code of Federal Regulations |
| CO | Carbon monoxide |
| CUP | Conditional Use Permit |
| DHS | California Department of Health Services |
| DMG | California Division of Mines and Geology |
| DOT | U. S. Department of Transportation |
| DSDD | California Department of Water Resources Division of Safety of Dams |
| EA | Environmental Assessment |
| EIR | Environmental Impact Report |
| EIS | Environmental Impact Statement |
| EPA | U.S. Environmental Protection Agency |

| ABBREVIATION | DEFINITION |
|---|---|
| °F | Degrees Fahrenheit |
| gpd | Gallons per day |
| gpm | Gallons per minute |
| HDPE | High density polyethylene |
| KCAPCD | Kern County Air Pollution Control District |
| KOP | Key observation point |
| LCRS | Leachate collection and recovery system |
| MCL | Maximum Contaminant Level |
| MOU | Memorandum of Understanding |
| mph | Miles per hour |
| MSHA | Federal Mine Safety and Health Administration |
| MSL | Mean Sea Level |
| NAAQS | National Ambient Air Quality Standards |
| NEPA | National Environmental Policy Act |
| $NO_2$ | Nitrogen dioxide |

| ABBREVIATION | DEFINITION |
|---|---|
| NOI | Notice of Intent |
| NOP | Notice of Preparation |
| NP | Neutralization potential |
| NPDES | National Pollutant Discharge Elimination System |
| NPPA | Native Plant Protection Act of 1977 |
| NSR | New Source Review |
| $O_3$ | Ozone |
| OHV | Off-highway vehicle |
| pH | The negative logarithm of the hydrogen ion activity used in expressing both acidity and alkalinity on a scale whose values run from 0 to 14 with 7 representing neutrality. |
| $PM_{2.5}$ | Suspended particulate matter less than 2.5 microns in aerodynamic diameter |
| $PM_{10}$ | Suspended particulate matter less than 10 microns in aerodynamic diameter |
| ppm | Parts per million |
| PSD | Prevention of Significant Deterioration |

| ABBREVIATION | DEFINITION |
|---|---|
| RCRA | Resource Conservation and Recovery Act |
| Regional Board | California Regional Water Quality Control Board |
| RRA | Ridgecrest Resource Area |
| SBBM | San Bernardino Baseline and Meridian |
| SCS | U.S. Soil Conservation Service |
| Service | U.S. Fish and Wildlife Service |
| SMARA | Surface Mining and Reclamation Act of 1975 |
| $SO_2$ | Sulfur dioxide |
| SPCC | Spill Prevention, Control, and Countermeasure Plan |
| SWRCB | State Water Resources Control Board |
| TSP | Total suspended particulates |
| UBC | Uniform Building Code |
| VRM | Visual Resource Management |
| WAD | Weak Acid Dissociable |
| WDR | Waste Discharge Requirements |

### 9.3 References

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